This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Harvard University

Library of

The Medical School

and

The School of Public Health

The Gift of

Dr. J.G. Greenfield

8136
2-50

MEDICO-CHIRURGICAL TRANSACTIONS.

PUBLISHED BY

THE ROYAL

MEDICAL AND CHIRURGICAL SOCIETY

OF

LONDON.

VOLUME THE THIRTY-FOURTH.

LONDON:
LONGMAN, BROWN, GREEN, AND LONGMANS,
PATERNOSTER-ROW.

1851.

HARVARD UNIVERSITY
SCHOOL OF MEDICINE AND PUBLIC HEALTH
LIBRARY

29 NOV 1935
Gift: Dr. J. G. Greenfield

WI G.G.1837.1

C. AND J. ADLARD, PRINTERS, BARTHOLOMEW CLOSE.

MEDICO-CHIRURGICAL TRANSACTIONS.

PUBLISHED BY

THE ROYAL

MEDICAL AND CHIRURGICAL SOCIETY

OF

LONDON.

SECOND SERIES.

VOLUME THE SIXTEENTH.

LONDON:

LONGMAN, BROWN, GREEN, AND LONGMANS,

PATERNOSTER-ROW.

1851.

ROYAL
MEDICAL AND CHIRURGICAL SOCIETY
OF LONDON.

PATRON.

THE QUEEN.

OFFICERS AND COUNCIL,
ELECTED MARCH 1, 1851.

PRESIDENT.

JOSEPH HODGSON, F.R.S.

VICE-PRESIDENTS.
- THOMAS MAYO, M.D. F.R.S.
- JOHN THOMSON, M.D.
- WILLIAM COULSON.
- ALEXANDER SHAW.

TREASURERS.
- ROBERT BENTLEY TODD, M.D. F.R.S.
- RICHARD QUAIN, F.R.S.

SECRETARIES.
- SETH THOMPSON, M.D.
- CAMPBELL DE MORGAN.

LIBRARIANS.
- HENRY PITMAN, M.D.
- JAMES DIXON.

OTHER MEMBERS OF THE COUNCIL.
- GEORGE CURSHAM, M.D.
- SIR JAMES EYRE, M.D.
- WILLIAM MACINTYRE, M.D.
- WILLIAM MERRIMAN, M.D.
- ALEX. SUTHERLAND, M.D. F.R.S.
- JAMES CLAYTON.
- HENRY HANCOCK.
- JOHN HILTON, F.R.S.
- HENRY CHARLES JOHNSON.
- ANDREW M. MACWHINNIE.

TRUSTEES OF THE SOCIETY.

JAMES M. ARNOTT, F.R.S.
JAMES COPLAND, M.D. F.R.S.
EDWARD STANLEY, F.R.S.

RESIDENT ASSISTANT-LIBRARIAN.

THOMAS WILLIAMS.

FELLOWS OF THE SOCIETY APPOINTED BY THE COUNCIL AS REFEREES OF PAPERS,

FOR THE SESSION OF 1849-50.

ADDISON, THOMAS, M.D.
ARNOTT, JAMES MONCRIEFF, F.R.S.
BALY, WILLIAM, M.D. F.R.S.
BARKER, THOMAS ALFRED, M.D.
BELL, THOMAS, F.R.S.
BIRD, GOLDING, M.D. F.R.S.
BOWMAN, WILLIAM, F.R.S.
BRODIE, BENJAMIN COLLINS, BART. F.R.S.
BURROWS, GEORGE, M.D. F.R.S.
BUSK, GEORGE, F.R.S.
COPLAND, JAMES, M.D. F.R.S.
DALRYMPLE, JOHN, F.R.S.
DICKSON, ROBERT, M.D.
FARRE, ARTHUR, M.D. F.R.S.
FERGUSON, ROBERT, M.D.
HALL, MARSHALL, M.D. F.R.S.
HAWKINS, CÆSAR HENRY.
HEWETT, PRESCOTT GARDNER.
HILTON, JOHN, F.R.S.
HODGKIN, THOMAS, M.D.
JONES, HENRY BENCE, M.D. F.R.S.
LANE, SAMUEL ARMSTRONG.
LAWRENCE, WILLIAM, F.R.S.
LEE, ROBERT, M.D. F.R.S.
LOCOCK, CHARLES, M.D.
MACILWAIN, GEORGE.
MAYO, THOMAS, M.D. F.R.S.
PEREIRA, JONATHAN, M.D. F.R.S. F.L.S.
PHILLIPS, BENJAMIN, F.R.S.
PITMAN, HENRY ALFRED, M.D.
SHAW, ALEXANDER.
STANLEY, EDWARD, F.R.S.
STROUD, WILLIAM, M.D.
TRAVERS, BENJAMIN, F.R.S.
WATSON, THOMAS, M.D.
WEST, CHARLES, M.D.

A LIST OF THE PRESIDENTS OF THE SOCIETY, FROM ITS FORMATION.

ELECTED

1805. WILLIAM SAUNDERS, M.D.
1808. MATTHEW BAILLIE, M.D.
1810. SIR HENRY HALFORD, Bart., M.D. G.C.H.
1813. SIR GILBERT BLANE, Bart., M.D.
1815. HENRY CLINE.
1817. WILLIAM BABINGTON, M.D.
1819. SIR ASTLEY PASTON COOPER, Bart., K.C.H. D.C.L.
1821. JOHN COOKE, M.D.
1823. JOHN ABERNETHY.
1825. GEORGE BIRKBECK, M.D.
1827. BENJAMIN TRAVERS.
1829. PETER MARK ROGET, M.D.
1831. WILLIAM LAWRENCE.
1833. JOHN ELLIOTSON, M.D.
1835. HENRY EARLE.
1837. RICHARD BRIGHT, M.D.
1839. SIR BENJAMIN COLLINS BRODIE, Bart.
1841. ROBERT WILLIAMS, M.D.
1843. EDWARD STANLEY.
1845. WILLIAM FREDERICK CHAMBERS, M.D. K.C.H.
1847. JAMES MONCRIEFF ARNOTT.
1849. THOMAS ADDISON, M.D.
1851. JOSEPH HODGSON.

FELLOWS

OF THE

ROYAL MEDICAL AND CHIRURGICAL SOCIETY

OF LONDON.

EXPLANATION OF THE ABBREVIATIONS.

P.—President.	V.P.—Vice-President.
T.—Treasurer.	S.—Secretary.
L.—Librarian.	C.—Member of Council.

AUGUST 1851.

Amongst the non-residents, those marked thus (*) are entitled by composition to receive the Transactions.

Elected

1841 *James Abercrombie, M.D., Cape of Good Hope.

1846 *John Abercrombie, M.D., Physician to the General Dispensary, Cheltenham; Cheltenham.

1851 *Henry Wentworth Acland, M.D. F.R.S., Physician to the Radcliffe Infirmary, Oxford.

1847 Elias Acosta, Caraccas; Venezuela.

1842 William Acton, Queen Anne-street, Cavendish-square.

1818 Walter Adam, M.D., Physician to the Royal Public Dispensary, Edinburgh.

1851 John Adams, Surgeon to the London Hospital; St. Helen's-place, Bishopsgate-street.

1818 Thomas Addison, M.D., Physician to, and Lecturer on Medicine at, Guy's Hospital; New-street, Spring-gardens. C. 1826. V.P. 1837. P. 1849.

1814 Joseph Ager, M.D., Great Portland-street, Portland-place. C. 1836.

1837 *Ralph Fawsett Ainsworth, M.D., Manchester.

1819 George Frederick Albert.

Elected

1839 RUTHERFORD ALCOCK, K.C.T. K.T.S., China.

1826 JAMES ALDERSON, M.D. F.R.S., Physician to St. Mary's Hospital; Berkeley-square. S. 1829. C. 1848. T. 1849.

1843 CHARLES JAMES BERRIDGE ALDIS, M.D., Physician to the London and Surrey Dispensaries, and Lecturer on Medicine at the Hunterian School of Medicine; Chester-terrace, Chester-square.

1850 CHARLES REVANS ALEXANDER, Assistant-Surgeon to the Royal Infirmary for Diseases of the Eye; Cork-street, Bond-street.

1813 HENRY ALEXANDER, F.R.S., Surgeon-Oculist in Ordinary to the Queen, and Surgeon to the Royal Infirmary for Diseases of the Eye; Cork-street, Bond-street. C. 1840. V.P. 1850.

1836 HENRY ANCELL, Norfolk-crescent, Oxford-square. C. 1847.

1817 ALEXANDER ANDERSON.

1820 THOMAS ANDREWS, M.D., Norfolk, Virginia.

1813 WILLIAM ANKERS, Knutsford.

1819 PROFESSOR ANTOMMARCHI, Florence.

1825 THOMAS GRAHAM ARNOLD, M.D., Stamford.

1818 WILLIAM WITHERING ARNOLD, M.D., Physician to the Infirmary and Lunatic Asylum, Leicester.

1819 JAMES MONCRIEFF ARNOTT, F.R.S., New Burlington-street. L. 1826. V.P. 1832. T. 1835. C. 1846. P. 1847.

1817 JOHN ASHBURNER, M.D. M.R.I.A.; Grosvenor-street. C. 1821.

1848 JAMES RAMSEY ATKINS, M.D. F.L.S., Grove House Lunatic Asylum; Stoke Newington-green.

1841 JOHN AVERY, Surgeon to the Charing-cross Hospital; Queen-street, May-fair.

1825 BENJAMIN GUY BABINGTON, M.D. F.R.S., Physician to Guy's Hospital, and Physician to the Deaf and Dumb Institution; George-street, Hanover-square. C. 1829. V.P. 1845. T. 1848.

1846 CORNELIUS METCALFE STUART BABINGTON, M.D., Physician to Queen Charlotte's Lying-in Hospital; 29, Hertford-street, May-fair.

Elected

1820 *JOHN H. BADLEY, Dudley.

1838 FRANCIS BADGLEY, M.D., Toronto, Upper Canada.

1840 WILLIAM BAINBRIDGE, Kingston, Surrey.

1836 ANDREW WOOD BAIRD, M.D., Ipswich.

1839 THOMAS GRAHAM BALFOUR, M.D., Royal Military Asylum; Chelsea.

1848 EDWARD BALLARD, M.D., Myddleton-square.

1849 THOMAS BALLARD, Southwick-place, Hyde-park.

1837 WILLIAM BALY, M.D. F.R.S., Physician to the Milbank Prison, and Lecturer on Forensic Medicine at St. Bartholomew's Hospital; Queen Anne-street, Cavendish-square. C. 1845. L. 1847. S. 1848.

1847 ANDREW WHYTE BARCLAY, M.D., Physician to the Chelsea Dispensary; Curzon-street, May-fair.

1848 EDGAR BARKER, Edgeware-road, Hyde-park.

1833 THOMAS ALFRED BARKER, M.D., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital; Grosvenor-street, Grosvenor-square. C. 1844.

1843 THOMAS HERBERT BARKER, Priory-terrace, Bedford.

1847 GEORGE HILARO BARLOW, M.D., Physician to Guy's Hospital; Union-street, Southwark.

1849 WILLIAM FREDERICK BARLOW, Resident Medical Officer, Westminster Hospital.

1840 BENJAMIN BARROW, Ryde, Isle of Wight.

1844 WILLIAM RICHARD BASHAM, M.D., Physician to, and Lecturer on Materia Medica at, the Westminster Hospital; Chester-street, Grosvenor-place.

1841 GEORGE BEAMAN, King-street, Covent-garden.

1836 WILLIAM BEAUMONT, Professor of Surgery in the University of King's College; Toronto, Upper Canada.

1840 CHARLES BEEVOR, Surgeon to the St. Marylebone Dispensary; Berners-street, Oxford-street.

1819 THOMAS BELL, F.R.S. L.S. and G.S., Professor of Zoology in King's College, London, and Lecturer on Diseases of the Teeth at Guy's Hospital; New Broad-street, City. C. 1832.

1847 JAMES HENRY BENNET, M.D., Cambridge-square, Hyde-park.

Elected

1845 EDWIN UNWIN BERRY, James-street, Covent-garden.

1820 STEPHEN BERTIN, Paris.

1827 WILLIAM BIRCH, Barton, Lichfield.

1845 GOLDING BIRD, M.D. F.R.S., Assistant-Physician to, and Lecturer on Materia Medica at, Guy's Hospital; Russell-square.

1850 JAMES BIRD, M.D., Hyde-park-square, Hyde-park.

1849 EDMUND LLOYD BIRKETT, M.D., 4, Montague-street, Russell-square.

1851 GEORGE BIRKETT, M.D., 9, Duncan-terrace, Islington.

1851 JOHN BIRKETT, Assistant Surgeon to, and Lecturer on Anatomy at, Guy's Hospital, 6, Wellington-street, Southwark.

1846 HUGH BIRT, Morro Velhio, Minas Geraes, Rio Janeiro, Brazil; Surgeon to the Morro Velhio Hospital.

1843 PATRICK BLACK, M.D., Assistant-Physician to St. Bartholomew's Hospital, and Physician to the Seamen's Hospital Ship "Dreadnought;" Bedford-square.

1844 THOMAS BLACKALL, M.D., Physician to the Seamen's Hospital Ship "Dreadnought;" Queen-street, Mayfair.

1847 GEORGE C. BLACKMAN, M.D., New York, U.S.

1839 RICHARD BLAGDEN, Surgeon-Accoucheur, and Surgeon Extraordinary to the Queen; Surgeon in Ordinary to Her Royal Highness the Duchess of Kent; Albemarle-street, Piccadilly. C. 1847.

1814 THOMAS BLAIR, M.D., Physician to the Sussex County Hospital; Brighton, Sussex.

1840 PEYTON BLAKISTON, M.D. F.R.S., St. Leonard's-on-Sea.

1845 HENRY BLENKINSOP, Warwick.

1811 *HENRY C. BOISRAGON, M.D., Cheltenham.

1823 LOUIS HENRY BOJANUS, M.D., Wilna.

1816 HUGH BONE, M.D., Inspector-General of Hospitals; Edinburgh.

1810 JOHN BOOTH, M.D., Physician to the General Hospital at Birmingham.

1846 PETER BOSSEY, Thomas-street, Woolwich.

1846 JOHN ASHTON BOSTOCK, 34, Clarges-street, Piccadilly.

Elected

1849 EDWARD BARONS BOWMAN, M.D., Oxford-terrace, Middleton-road, Dalston.

1841 WILLIAM BOWMAN, F.R.S., Professor of Physiology and General Anatomy at King's College, London, and Assistant-Surgeon to King's College Hospital, and to the Royal Ophthalmic Hospital, Moorfields; Clifford-street, Bond-street.

1844 ROBERT BRANDON.

1814 RICHARD BRIGHT, M.D. F.R.S., Physician Extraordinary to the Queen, and Consulting Physician to Guy's Hospital; Savile-row, Regent-street. C. 1821. V.P. 1827. P. 1837.

1851 BERNARD EDWARD BRODHURST, Assistant-Surgeon to the Royal Orthopædic Hospital, Brook-street, Grosvenor-square.

1813 SIR BENJAMIN COLLINS BRODIE, BART., D.C.L. F.R.S., Serjeant-Surgeon to the Queen, Surgeon in Ordinary to His Royal Highness Prince Albert, Foreign Correspondent of the Institute of France, and Foreign Associate of the Royal Academy of Medicine of Paris; Savile-row, Regent-street. C. 1814. V.P. 1816. P. 1839.

1844 CHARLES BROOKE, B.A. (Cantab.) F.R.S., Keppel-street, Russell-square.

1848 WILLIAM PHILPOT BROOKES, M.D., Surgeon to the Cheltenham General Hospital and Dispensary, and Visiting Medical Officer to the Cheltenham District of Lunatic Asylums; Albion House, Cheltenham.

1842 CHARLES BLAKELY BROWN, M.B., Physician to Queen Charlotte's Lying-in Hospital, and St. George's and St. James's Dispensary; Hill-street, Berkeley-square.

1847 GEORGE BROWN, Grenadier Guards' Hospital, Rochester-row, Westminster.

1847 *ROBERT BROWN, Winckley-square, Preston, Lancashire.

1851 ALEXANDER BROWNE, M.D., Army and Navy Club, St. James's-square.

1818 *SAMUEL BARWICK BRUCE, Surgeon to the Forces; Ripon.

1827 M. PIERRE BRULATOUR, Surgeon to the Hospital; Bordeaux.

1823 B. BARTLET BUCHANAN, M.D.

Elected

1843 JOHN CHARLES BUCKNILL, M.B., Axminster, Devonshire.

1839 GEORGE BUDD, M.D. F.R.S., Fellow of Caius College, Cambridge; Professor of Medicine in King's College, London; Physician to King's College Hospital; Dover-street, Piccadilly. C. 1846.

1839 THOMAS HENRY BURGESS, M.D., Half-moon-street, Piccadilly.

1833 GEORGE BURROWS, M.D. F.R.S., Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; Cavendish-square. C. 1839. T. 1845. V.P. 1849.

1820 SAMUEL BURROWS.

1837 GEORGE BUSK, F.R.S., Surgeon to the Seamen's Hospital-ship "Dreadnought;" Croom's-hill, Greenwich. C. 1847.

1850 JOHN STEVENSON BUSHNAN, M.D., Nottingham-place, New Road.

1818 JOHN BUTTER, M.D. F.R.S. F.L.S., Physician to the Plymouth Eye Infirmary; Plymouth.

1851 WILLIAM CADGE, Assistant-Surgeon to University College Hospital; 9, Huntley-street, Bedford-square.

1851 THOMAS CALLAWAY, Demonstrator of Anatomy at Guy's Hospital; Wellington-street, Southwark.

1842 HENRY CANTIS, Maddox-street, Hanover-square.

1847 JOHN BURFORD CARLILL, M.D., Berners-street, Oxford-street.

1839 SIR ROBERT CARSWELL, M.D., Physician to his Majesty the King of the Belgians; Brussels.

1825 HARRY CARTER, M.D., Physician to the Kent and Canterbury Hospital; Canterbury.

1818 RICHARD CARTWRIGHT, Bloomsbury-square.

1820 SAMUEL CARTWRIGHT, F.R.S., Savile-row, Regent-street, and Nizell's House, near Tonbridge.

1845 SAMUEL CARTWRIGHT, Jun., Savile-row, Regent-street.

1839 WILLIAM CATHROW, Weymouth-street, Portland-place.

1845 WILLIAM OLIVER CHALK, Nottingham-terrace, New-road.

1818 RICHARD CHAMBERLAINE, Kingston, Jamaica.

1844 THOMAS KING CHAMBERS, M.D., Physician to St. Mary's Hospital; Hill-street, Berkeley-square.

1816 WILLIAM FREDERICK CHAMBERS, M.D. K.C.H. F.R.S., Physician to the Queen; Hardle House, near Lymington, Hants. C. 1818. V.P. 1821. P. 1845.

Elected

1849 Frederick Chapman, Richmond-green, Richmond, Surrey.

1837 Henry Thomas Chapman, Lower Seymour-street, Portman-square.

1838 George Chaplin Child, M.D., Consulting Physician to the Westminster General Dispensary; Queen Anne-street, Cavendish-square.

1849 William Francis Chorley, M.D., Physician to the St. Marylebone Dispensary; 3, South Molton-street, Oxford-street.

1842 William Dingle Chowne, M D., Physician to the Charing-cross Hospital; Connaught-place West, Hyde-park.

1847 Benjamin Clark, Brook-street, Grosvenor-square.

1839 Frederick Le Gros Clark, Assistant-Surgeon to, and Lecturer on Descriptive and Surgical Anatomy at, St. Thomas's Hospital; Consulting Surgeon to the Western General Dispensary; Spring-gardens. S. 1847.

1827 Sir James Clark, Bart., M.D. F.R.S., Physician to the Queen, Physician in Ordinary to His Royal Highness Prince Albert, and Consulting Physician to his Majesty the King of the Belgians; Brook-street, Grosvenor-square. C. 1830. V.P. 1832.

1845 John Clark, M.D., Staff Surgeon, 2d class; West Indies.

1848 John Clarke, M.D., Physician to the British Lying-in Hospital; Clifford-street, Bond-street.

1850 Josiah Clarkson, New Hall-street, Birmingham.

1835 James Clayton, Percy-street, Bedford-square. C. 1850.

1842 Oscar Moore Passey Clayton, Percy-street, Bedford-square.

1851 Edward Cock, Surgeon to Guy's Hospital; St. Thomas's-street, Southwark.

1850 Daniel Whitaker Cohen, M.D., Assistant Physician to St. Thomas's Hospital; Cleveland-row, St. James's.

1835 *William Colborne, Chippenham, Wiltshire.

1818 Robert Cole, F.L.S., Holybourne, Hampshire.

1828 John Conolly, M.D., Hanwell, Middlesex.

1840 *William Robert Cooke, Burford, Oxfordshire.

1820 Benjamin Cooper, Stamford.

Elected

1840 BRANSBY BLAKE COOPER, F.R.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital; New-street, Spring-gardens. C. 1830. V.P. 1842.

1819 GEORGE COOPER, Brentford, Middlesex.

1841 GEORGE LEWIS COOPER, Surgeon to the Bloomsbury Dispensary; Woburn-place, Russell-square.

1843 WILLIAM WHITE COOPER, Senior Surgeon to the North London Eye Infirmary, to the Honorable Artillery Company, and Ophthalmic Surgeon to St. Mary's Hospital; Berkeley-sq.

1841 HOLMES COOTE, Demonstrator of Anatomy at St. Bartholomew's Hospital; Robert-street, Adelphi.

1835 GEORGE FORD COPELAND, Cheltenham.

1822 JAMES COPLAND, M.D. F.R.S., Consulting Physician to Queen Charlotte's Lying-in Hospital; Old Burlington-street. C. 1830. V.P. 1838.

1847 JOHN ROSE CORMACK, M.D., Putney, Surrey.

1839 *CHARLES CÆSAR CORSELLIS, M.D., Resident Physician to the Lunatic Asylum, Wakefield, Yorkshire.

1814 *WILLIAM COTHER, Surgeon to the Infirmary, Gloucester.

1847 RICHARD PAYNE COTTON, M.D., Assistant-Physician to the Hospital for Consumption and Diseases of the Chest; Bolton-street, Piccadilly.

1828 WILLIAM COULSON, *Vice-President*, Surgeon to the Magdalen Hospital, Consulting Surgeon to the City Lying-in Hospital, and Senior-Surgeon to St. Mary's Hospital; Frederick's-place, Old Jewry. C. 1831. L. 1832.

1817 *SIR PHILIP CRAMPTON, Bart., F.R.S., Surgeon-General to the Forces in Ireland, Dublin.

1841 MERVYN ARCHDALL NOTT CRAWFORD, M.D., Physician to, and Lecturer on Medicine at, the Middlesex Hospital; Upper Berkeley-street, Portman-square.

1822 SIR ALEXANDER CRICHTON, M.D. F.R.S. and F.L.S., Physician in Ordinary to their Imperial Majesties the Emperor and Dowager Empress of all the Russias; the Grove, Sevenoaks, Kent. C. 1823.

1847 GEORGE CRITCHETT, Assistant-Surgeon to the London Hospital, and the Royal London Ophthalmic Hospital; Finsbury-square.

Elected

1837 JOHN FARRAR CROOKES, Russell-square.

1849 *WILLIAM EDWARD CROWFOOT, Beccles, Suffolk.

1851 JAMES CAMERON CUMMING, M.D., 1, Cadogan-place, Sloane-street.

1818 WILLIAM CUMING, M.D., Professor of Botany at the Glasgow Institution and Surgeon to the Royal Infirmary at Glasgow.

1846 HENRY CURLING, Ramsgate, Kent.

1837 THOMAS BLIZARD CURLING, F.R.S., Surgeon to, and Lecturer on Surgery at, the London Hospital; New Broad-street, City. S. 1845. C. 1850.

1847 JOHN EDMUND CURREY, M.D., Lismore, Ireland.

1836 GEORGE CURSHAM, M.D., Physician to the Hospital for Consumption and Diseases of the Chest, and to the Female Orphan Asylum; Savile-row, Regent-street. S. 1842. C. 1850.

1822 CHRISTOPHER JOHN CUSACK, Chateau d'Eu, France.

1828 ADOLPHE DALMAS, M.D., Paris.

1840 JOHN DALRYMPLE, F.R.S., Consulting Surgeon to the London Ophthalmic Hospital; Grosvenor-street, Grosvenor-square. C. 1848.

1851 NATHANIEL JOHN DAMPIER, Woburn-place, Russell-square.

1836 *JAMES STOCK DANIEL, Ramsgate.

1850 JOHN BAMPFYLDE DANIELL, M.D., Physician to the Royal Pimlico Dispensary; Grosvenor-street, Grosvenor-square.

1820 GEORGE DARLING, M.D., Russell-square. C. 1841.

1818 *SIR FRANCIS SACHEVEREL DARWIN, Knt., M.D., Breadsall Priory, near Derby.

1848 HENRY DAUBENY, Manchester-square.

1846 FREDERICK DAVIES, Upper Gower-street, Bedford-square.

1818 *HENRY DAVIES, M.D., 6, Duchess-street, Portland-place. C. 1827. V.P. 1848.

1847 JOHN DAVIES, M.D., Physician to the Hertford Infirmary, and Visiting Physician to the County Gaol and Lunatic Asylum, Hertford.

1820 THOMAS DAVIS, Brook-street, Hanover-square. C. 1843.

1818 JAMES DAWSON, Liverpool.

Elected

1847 GEORGE EDWARD DAY, M.D. F.R.S., Chandos Professor of Medicine, St. Andrew's.

1841 CAMPBELL DE MORGAN, *Secretary*, Surgeon to, and Lecturer on Physiology at, the Middlesex Hospital; Upper Seymour-street, Portman-square.

1846 *SAMUEL BEST DENTON, Ivy-lodge, Hornsea, East Riding, Yorkshire.

1844 ROBERT DICKSON, M.D., Hertford-street, May-fair.

1839 JAMES DIXON, *Librarian*, Assistant-Surgeon to St. Thomas's Hospital, and Surgeon to the Royal London Ophthalmic Hospital, Green-street, Park-lane.

1845 JOHN DODD, Bryanston-street, Portman-square.

1839 HENRY PYE LEWIS DREW, Gower-street, Portman-square.

1846 JOHN DRUMMOND, Deputy Inspector of Fleets and Hospitals; Royal Naval Hospital, Chatham.

1843 THOMAS JONES DRURY, M.D., Physician to the Salop Infirmary; Shrewsbury, Shropshire.

1845 GEORGE DUFF, M.D., Genoa.

1845 EDWARD WILLSON DUFFIN, Langham-place, Portland-place.

1833 ROBERT DUNN, Norfolk-street, Strand. C. 1845.

1843 CHRISTOPHER MERCER DURRANT, M.D., Physician to the East Suffolk and Ipswich Hospital; Ipswich, Suffolk.

1839 HENRY SUMNER DYER, M.D., Bryanston-square.

1836 JAMES WILLIAM EARLE, Norwich.

1824 GEORGE EDWARDS.

1823 CHARLES CHANDLER EGERTON, Kendal Lodge, Epping.

1848 GEORGE VINER ELLIS, Professor of Anatomy in University College, London; Albert-street, Regent's-Park.

1835 WILLIAM ENGLAND, M.D., Wisbeach, Cambridgeshire.

1842 JOHN ERIC ERICHSEN, Professor of Surgery in University College, London, and Surgeon to University College Hospital; Welbeck-street, Cavendish-square.

1815 GRIFFITH FRANCIS DORSETT EVANS, M.D., High-street, Bedford. C. 1838.

1836 GEORGE FABIAN EVANS, M.B., Physician to the Birmingham Hospital, Waterloo-street, Birmingham.

1845 WILLIAM JULIAN EVANS, M.D.

Elected

1841 Sir James Eyre, M.D., Physician-Accoucheur to St. George's and St. James's Dispensary; Brook-street, Grosvenor-square. C. 1851.

1844 Arthur Farre, M.D. F.R.S., Professor of Midwifery in King's College, London; Hertford-street, May-fair.

1831 Robert Ferguson, M.D., Physician-Accoucheur to the Queen, Physician to the Westminster Lying-in Hospital; Park-street, Grosvenor-square. C. 1839. V.P. 1847.

1841 William Fergusson, F.R.S., Professor of Surgery in King's College, London; Surgeon to King's College Hospital, and to H.R.H. Prince Albert; George-street, Hanover-square. C. 1849.

1850 *Frederick Field, Birmingham.

1849 George Tupman Fincham, M.D., Physician to the Western Dispensary; Chapel-street, Grosvenor-place.

1836 John William Fisher, Surgeon-in-Chief to the Metropolitan Police Force; Grosvenor-gate. C. 1843.

1838 George Lionel Fitzmaurice, Gloucester-place, Portman-square.

1842 Thomas Bell Elcock Fletcher, M.D., Physician to the General Dispensary, Birmingham.

1841 John Forbes, M.D. F.R.S., Physician to her Majesty's Household; Old Burlington-street.

1848 John Gregory Forbes, Devonport-street, Hyde-park.

1817 *Robert Thomas Forster, Southwell, Notts.

1820 Thomas Forster, M.D., Hartfield-lodge, East Grinstead.

1846 Algernon Frampton, M.D., Physician to the London Hospital; New Broad-street, City.

1816 John W. Francis, M.D., Professor of Materia Medica in the University of New York, U.S.

1841 John Christopher August. Franz, M.D., Royal German Spa, Brighton.

1843 Patrick Fraser, M.D., Assistant-Physician to the London Hospital; Guilford-street, Russell-square.

1836 John George French, Surgeon to St. James's Infirmary; Great Marlborough-street, Regent-street.

1849 Robert Temple Frere, M.D., Physician-Accoucheur to, and Lecturer on Midwifery at, the Middlesex Hospital; Queen-street, May-fair.

Elected

1846 HENRY WILLIAM FULLER, M.B., Assistant-Physician to, and Lecturer on Medical Jurisprudence at, St. George's Hospital, Manchester-square.

1815 *GEORGE FREDERICK FURNIVAL, Egham, Surrey.

1851 GEORGE GASKOIN, Cambridge-terrace, Hyde-park.

1819 JOHN SAMUEL GASKOIN, Clarges-street, Piccadilly. C. 1836.

1819 HENRY GAULTER.

1848 JOHN GAY, Surgeon to the Royal Free Hospital; Finsbury-place, Finsbury-square.

1821 *RICHARD FRANCIS GEORGE, Surgeon to the Bath Hospital.

1841 JOHN DURANCÉ GEORGE, F.G.S., Lecturer on Dental Surgery at University College, London, and Dental Surgeon to University College Hospital; Old Burlington-street.

1812 GEORGE GOLDIE, M.D., York.

1851 STEPHEN JENNINGS GOODFELLOW, M.D., Physician to the Royal General Dispensary, and Lecturer on Forensic Medicine at the Middlesex Hospital; Russell-square.

1818 JAMES ALEXANDER GORDON, M.D. F.R.S., Burford-lodge, Box-hill. C. 1828. V.P. 1829.

1851 PETER YEAMES GOWLLAND, Finsbury-square.

1844 JOHN GRANTHAM, Crayford, Kent.

1850 HENRY GRAY, Wilton-street, Grosvenor-place.

1846 GEORGE THOMPSON GREAM, M.D., Hertford-street, Mayfair.

1816 JOSEPH HENRY GREEN, F.R.S., Surgeon to, and Lecturer on Surgery at, St. Thomas's Hospital; Hadley, Middlesex. C. 1820. V.P. 1830.

1841 GEORGE GREGORY, M.D., Physician to the Smallpox Hospital; Camden-square, Camden New-town. S. 1825. C. 1849.

1843 ROBERT GREENHALGH, Surgeon-Accoucheur to the Royal General Dispensary, St. Pancras; 11, Upper Woburn-place, Russell-square.

1814 JOHN GROVE, M.D., Salisbury.

1849 WILLIAM WITHEY GULL, M.D., Assistant-Physician to Guy's Hospital; St. Thomas's-street, Southwark.

1837 JAMES MANBY GULLY, M.D., Holyrood-house, Great Malvern.

1819 SIR JOHN GUNNING, Knight, C.B., Inspector of Hospitals; Paris.

Elected

1842 CHARLES WILLIAM GARDINER GUTHRIE, Assistant-Surgeon to the Westminster Hospital, and to the Westminster Ophthalmic Hospital, Pall-Mall, St. James's.

1849 HAMMETT HAILEY, Newport Pagnell, Bucks.

1842 *GEORGE HALL, M.D.

1845 JOHN HALL, M.D., Deputy Inspector-General of Hospitals; Cape of Good Hope.

1848 ALEXANDER HALLEY, M.D., Queen Anne-street, Cavendish-square.

1819 THOMAS HAMMERTON, Piccadilly. C. 1829.

1838 HENRY HANCOCK, Surgeon to the Charing-cross Hospital; Harley-street, Cavendish-square. C. 1851.

1849 *RICHARD JAMES HANSARD, Broad-street, Oxford.

1848 *GEORGE HARCOURT, M.D., Chertsey, Surrey.

1836 JOHN FOSSE HARDING, Mylne-street, Myddleton-square.

1843 THOMAS SUNDERLAND HARRISON, M.D. F.L.S., Garston-lodge, Somersetshire.

1846 JOHN HARRISON, the Court-yard, Albany.

1841 WILLIAM HARVEY, Surgeon to the Royal Dispensary for Diseases of the Ear, and to the Freemasons' Female Charity; Soho-square.

1828 CÆSAR HENRY HAWKINS, Vice-President of the Royal College of Surgeons of England, Surgeon to St. George's Hospital; Grosvenor-street, Grosvenor-square. C. 1830. V.P. 1838. T. 1841.

1838 CHARLES HAWKINS, Savile-row, Regent-street. C. 1846. S. 1850.

1848 THOMAS HAWKSLEY, M.D., George-street, Hanover-square.

1820 THOMAS EMERSON HEADLAM, M.D., Newcastle-upon-Tyne.

1848 JAMES NEWTON HEALE, M.D., Physician to the Royal Free Hospital; Westbourne-crescent, Hyde-park.

1850 GEORGE HEATON, M.D., Boston, U.S.

1829 THOMAS HEBERDEN, M.D., Park-street, Grosvenor-square.

1844 JOHN HENNEN, M.D., Physician to the Western General Dispensary; Upper Southwick-street, Hyde-Park. L. 1848.

Elected

1848 MITCHELL HENRY, Assistant-Surgeon to the Middlesex Hospital; Harley-street, Cavendish-square.

1849 AMOS HENRIQUES, Upper Berkeley-street, Portman-square.

1821 VINCENT HERBERSKI, M.D., Professor of Medicine in the University of Wilna.

1843 PRESCOTT GARDNER HEWETT, Assistant-Surgeon to St. George's Hospital, Lecturer on Anatomy at St. George's Hospital Medical School; Hertford-street, May-fair.

1841 *NATHANIEL HIGHMORE, Consulting-Surgeon to the Weymouth and Dorsetshire Eye Infirmary; Sherborne, Dorsetshire.

1814 *WILLIAM HILL, Wooton-under-Edge, Gloucestershire.

1842 WILLIAM AUGUSTUS HILLMAN, Lecturer on Anatomy and Physiology at the Westminster Hospital, Surgeon to the Farringdon General Dispensary; Argyll-street, Regent-street.

1841 JOHN HILTON, F.R.S., Surgeon to, and Lecturer on Anatomy at, Guy's Hospital; New Broad-street, City. C. 1851.

1848 MARTIN THOMAS HISCOX, M.D., Bath, Somersetshire.

1840 THOMAS HODGKIN, M.D., Bedford-square. C. 1842.

1813 JOSEPH HODGSON, F.R.S., *President;* Westbourne-terrace, Hyde-park. C. 1817.

1835 THOMAS HENRY HOLBERTON, Hampton, Middlesex.

1843 LUTHER HOLDEN, Ely-place, Holborn.

1814 HENRY HOLLAND, M.D. F.R.S., Physician Extraordinary to the Queen, and Physician in Ordinary to H.R.H. Prince Albert; Brook-street, Grosvenor-square. C. 1817. V.P. 1826.

1846 BARNARD WIGHT HOLT, Surgeon to the Westminster Hospital; Parliament-street, Westminster.

1846 CARSTEN H. HOLTHOUSE, Surgeon to the Public Dispensary, Lincoln's Inn; Lecturer on Anatomy and Physiology; Serle-street, Lincoln's-inn-fields.

1819 *JOHN HOWELL, M.D. F.R.S. E.; Clifton, Gloucestershire.

1828 *EDWARD HOWELL, M.D., Swansea, Glamorganshire.

1844 EDWIN HUMBY, Windsor-terrace, Maida-hill.

1822 ROBERT HUME, M.D. C.B., Inspector of Hospitals; Commissioner in Lunacy; Curzon-street, May-fair. V.P. 1836.

Elected

1840 HENRY HUNT, M.D., Brook-street, Hanover-square.

1842 CHRISTOPHER THOMAS AGRIPPA HUNTER, Downham, Norfolk.

1849 EDWARD LAW HUSSEY, Surgeon to the Radcliffe Infirmary, Oxford.

1820 WILLIAM HUTCHINSON, M.D.

1840 CHARLES HUTTON, M.D., Physician to the Royal Infirmary for Children; Lowndes-street, Belgrave-square.

1848 GEORGE COCKBURN HYDE, Montpelier-square, Brompton.

1838 WILLIAM IFIL, M.D.

1847 WILLIAM EDMUND IMAGE, Surgeon to the Suffolk General Hospital; Bury St. Edmund's, Suffolk.

1826 WILLIAM INGRAM, Midhurst, Sussex.

1839 ALEXANDER RUSSELL JACKSON, M.D., Warley Barracks, Essex.

1845 *HENRY JACKSON, Surgeon to the Sheffield General Infirmary; St. James's-row, Sheffield.

1841 PAUL JACKSON, Thayer-street, Manchester-square.

1847 THOMAS REYNOLDS JACKSON, Charles-street, St. James's.

1841 MAXIMILIAN MORITY JACOBOVICZ, M.D., Pesth.

1825 JOHN B. JAMES, M.D.

1847 *WILLIAM WITHALL JAMES, Exeter, Devonshire.

1844 SAMUEL JOHN JEAFFRESON, M.D., Leamington, Warwickshire.

1839 JULIUS JEFFREYS, F.R.S., Bath, Somersetshire.

1840 *GEORGE SAMUEL JENKS, M.D., Brighton.

1851 WILLIAM JENNER, M.D., Professor of Pathological Anatomy in University College, and Assistant-Physician to University College Hospital, Albany-street, Regent's-park.

1848 ATHOL ARCHIBALD WOOD JOHNSON, Lecturer on Physiology at St. George's Hospital Medical School; and Surgeon to St. George's and St. James's Dispensary; Half Moon-street, Piccadilly.

1851 EDMUND CHARLES JOHNSON, M.D., Savile-row; and Arlington-street, Piccadilly.

1821 SIR EDWARD JOHNSON, M.D., Weymouth, Dorsetshire.

1847 GEORGE JOHNSON, M.D., Assistant-Physician to King's College Hospital; Woburn-square.

Elected

1837 HENRY CHARLES JOHNSON, Assistant-Surgeon to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; Savile-row, Regent-street. C. 1850.

1844 JOHN JOHNSTON, Old Burlington-street.

1844 HENRY BENCE JONES, M.D. F.R.S., Physician to St. George's Hospital; Grosvenor-street, Grosvenor-square.

1835 HENRY DERVICHE JONES, Soho-square.

1837 THOMAS WILLIAM JONES, M.D., Physician to the City Dispensary; Finsbury-pavement, Finsbury-square.

1829 *GEORGE CHARLES JULIUS, Richmond, Surrey.

1816 *GEORGE HERMANN KAUFFMANN, M.D., Hanover.

1815 ROBERT KEATE, Serjeant-Surgeon to the Queen, Surgeon to H.R.H. the Duchess of Gloucester, and to St. George's Hospital; Hertford-street, May-fair. C. 1818. V.P. 1826.

1848 *DANIEL BURTON KENDELL, M.D., St. John's, Wakefield, Yorkshire.

1847 ALFRED KEYSER, Norfolk-crescent, Oxford-square.

1839 *DAVID KING, M.D., Eltham, Kent.

1851 JOHN ABERNETHY KINGDON, New Bank-buildings, City.

1836 PETER NUGENT KINGSTON, M.D., Physician to the Westminster Hospital; Curzon-street, May-fair. C. 1846.

1806 JAMES LAIRD, M.D.

1840 SAMUEL ARMSTRONG LANE, Lecturer on Anatomy; Surgeon to the Lock Hospital, and to St. Mary's Hospital; Grosvenor-place, Hyde-park. C. 1849.

1841 *CHARLES LASHMAR, M.D., Croydon, Surrey.

1816 G. E. LAWRENCE.

1809 WILLIAM LAWRENCE, F.R.S., Surgeon Extraordinary to the Queen; Surgeon to St. Bartholomew's Hospital, and to Bridewell and Bethlem Hospitals; Lecturer on Surgery at St. Bartholomew's Hospital; Whitehall-place, Whitehall. S. 1813. V.P. 1818. C. 1820. T. 1821. P. 1831.

1840 THOMAS LAYCOCK, M.D., York.

1843 *JESSE LEACH, Heywood, near Bury, Lancashire.

1823 JOHN G. LEATH, M.D.

1822 JOHN JOSEPH LEDSAM, Surgeon to the Birmingham Eye Infirmary; Birmingham.

Elected

1822 Robert Lee, M.D. F.R.S., Physician to the British Lying-in Hospital; Physician-Accoucheur to the St. Marylebone Infirmary; and Lecturer on Midwifery at St. George's Hospital; Savile-row, Regent-street. C. 1829. S. 1830. V.P. 1835.

1823 Henry Lee, M.D., Keppel-street, Russell-square. C. 1837. S. 1839.

1843 Henry Lee, Assistant-Surgeon to King's College Hospital, and Surgeon to the Lock Hospital; Dover-street, Piccadilly.

1851 George Macartney Leese, Gloucester-place, Portman-square.

1836 Frederick Leighton, M.D., Franckfort-on-the-Maine.

1847 John Charles Weaver Lever, M.D., Physician-Accoucheur to Guy's Hospital; Wellington-street, Southwark.

1847 Sir John Liddell, M.D. F.R.S. C.B., Inspector of Hospitals; Royal Hospital, Greenwich.

1806 John Lind, M.D.

1845 William John Little, M.D., Physician to, and Lecturer on Medicine at, the London Hospital; Finsbury-square.

1819 Robert Lloyd, M.D.

1824 Eusebius Arthur Lloyd, Surgeon to St. Bartholomew's and Christ's Hospitals; Bedford-row. S. 1827. V.P. 1838. C. 1843.

1820 J. G. Locher, M.C.D., Town Physician of Zurich.

1844 Edward Francis Lonsdale, Assistant-Surgeon to the Royal Orthopædic Hospital; Montague-street, Russell-square.

1824 Charles Locock, M.D., First Physician-Accoucheur to the Queen, and Consulting Physician to the General Lying-in Hospital; Hertford-street, May-fair. C. 1826. V.P. 1841.

1846 Henry Thomas Lomax, Stafford.

1836 Joseph S. Löwenfeld, M.D., Berbice.

1815 *Peter Luard, M.D.

1847 Henry John M'Dougall.

1846 William M'Ewen, M.D., Surgeon to the Cheshire County Gaol, and House-Surgeon to the Chester General Infirmary; Newgate-street, Chester.

Elected

1814 Sir James Macgrigor, Bart., M.D. K.C.B. K.T.S. LL.D. F.R.S. L. and E., Director-General of the Medical Department of the Army; Harley-street, Cavendish-square. C. 1820. V.P. 1815.

1823 George Macilwain, Consulting Surgeon to the Finsbury Dispensary; The Court-Yard, Albany. C. 1829. V.P. 1848.

1839 William Macintyre, M.D., Harley-street, Cavendish-square. C. 1850.

1848 Frederick William Mackenzie, M.D., Chester-place, Hyde-park-square.

1818 William Mackenzie, Surgeon to the Eye Infirmary, Glasgow.

1822 Richard Mackintosh, M.D.

1844 Daniel Maclachlan, M.D., Physician to the Royal Hospital, Chelsea, and Deputy Inspector-General of Hospitals; Royal Hospital, Chelsea.

1851 Samuel Maclean, Brook-street, Grosvenor-square.

1849 David Macloughlin, M.D., Chapel-place, Cavendish-square.

1849 Duncan Maclachlan Maclure, Harley-street, Cavendish-square.

1842 John Macnaught, M.D., Bedford-street, Liverpool.

1835 Daniel Chambers Macreight, M.D., St. Hillier's, Jersey.

1837 Andrew Melville M'Whinnie, Lecturer on Comparative Anatomy at St. Bartholomew's Hospital; Assistant-Surgeon to the London Hospital for Diseases of the Skin; Bridge-street, Blackfriars. C. 1851.

1848 William Orlando Markham, M.D., Assistant-Physician to St. Mary's Hospital; Clarges-street, Piccadilly.

1824 Sir Henry Marsh, Bart., M.D., Dublin.

1838 Thomas Parr Marsh, M.D., Physician to the Salop Infirmary, Shrewsbury.

1851 John Marshall, Assistant-Surgeon to University College Hospital; Mornington-crescent-place, Hampstead-road.

1840 John Marston, Gloucester-gardens, Hyde-park.

1841 James Ranald Martin, F.R.S., Lower Grosvenor-street, Grosvenor-square.

Elected

1819 *JOHN MASPEN, Surgeon to the County General Infirmary, and Fever Hospital, Stafford.

1849 GEORGE BELLASIS MASPEN, Stafford.

1818 J. P. MAUNOIR, Professor of Surgery at Geneva.

1820 HERBERT MAYO, F.R.S., Boppart-on-the-Rhine. S. 1825. V.P. 1834.

1837 THOMAS MAYO, M.D. F.R.S., *Vice-President*, Physician to the St. Marylebone Infirmary; Wimpole-street, Cavendish-square. S. 1841. C. 1847.

1839 RICHARD HENRY MEADE, Bradford, Yorkshire.

1819 *THOMAS MEDHURST, Hurstbourne Tarrant, Hampshire.

1837 SAMUEL WILLIAM JOHN MERRIMAN, M.D., Physician to the Royal Infirmary for Children, Consulting Physician to the Westminster General Dispensary, and Assistant-Physician to the West London Lying-in Institution; Brook-street, Grosvenor-square. C. 1851.

1847 EDWARD MERYON, M.D. (Lond.), Clarges-street, Piccadilly.

1815 AUGUSTUS MEYER, M.D., St. Petersburgh.

1840 RICHARD MIDDLEMORE, Surgeon to the Eye Infirmary, Birmingham.

1847 JAMES MILLER, M.D., Welbeck-street, Cavendish-square.

1818 *PATRICK MILLER, M.D. F.R.S. E., Physician to the Devon and Exeter Hospitals, and to the Lunatic Asylum; Exeter, Devonshire.

1848 GAVIN MILROY, M.D.

1844 NATHANIEL MONTEFIORE, Hyde-park-square, Hyde-park.

1828 JOSEPH MOORE, M.D., Physician to the Royal Freemasons' Female Charity; Consulting Physician to Queen Charlotte's Lying-in Hospital; Savile-row, Regent-street. C. 1837.

1836 GEORGE MOORE, M.D., Hastings.

1848 CHARLES HEWITT MOORE, Surgeon to, and Lecturer on Anatomy at, the Middlesex Hospital; Mortimer-street, Cavendish-square.

1851 FREDERICK JOHN MOUAT, M.D., Professor of Medicine in the Medical College of Calcutta, and Secretary of the Council of Education in India; Calcutta.

1814 *GEORGE FREDERICK MUHRY, M.D., Hanover.

Elected

1847 SIMON MURCHISON, Lower Heyford, Oxon.

1841 EDWARD WILLIAM MURPHY, M.D., Professor of Midwifery in University College, London; Henrietta-street, Cavendish-square.

1845 THOMAS D. MUTTER, M.D., Professor of Surgery in Jefferson Medical College; Philadelphia.

1840 ROBERT NAIRNE, M.D., Physician to, and Lecturer on Medicine at, St. George's Hospital; Charles-street, Berkeley-square. C. 1848.

1835 THOMAS ANDREW NELSON, M.D., George-street, Portman-square.

1843 EDWARD NEWTON, Howland-street, Fitzroy-square.

1851 JAMES NICHOLS, Savile-row, Regent-street.

1816 THOMAS NIXON (Army).

1819 *GEORGE NORMAN, Surgeon to the United Hospital and Puerperal Charity; Bath, Somersetshire.

1849 HENRY BURFORD NORMAN, Surgeon to the St. Marylebone Dispensary, and to the Western Ophthalmic Institution; Duchess-street, Portland-place.

1845 HENRY NORRIS, South Petherton, Somerset.

1849 *ARTHUR NOVERRE, Great Stanmore, Middlesex.

1847 *WILLIAM EDWARD CHARLES NOURSE, Clapham, near Worthing, Sussex.

1843 WILLIAM O'CONNOR, George-street, Portman-square.

1847 THOMAS O'CONNOR, March, Cambridgeshire.

1846 FRANCIS ODLING, Devonshire-street, Portland-place.

1822 JAMES ADEY OGLE, M.D. F.R.S., Clinical and Aldrichian Professor of Medicine, Oxford; and Senior Physician to the Radcliffe Infirmary; Oxford.

1850 HENRY OLDHAM, M.D., Obstetric Physician to Guy's Hospital; Devonshire-square, Bishopsgate street.

1842 WILLIAM PIERS ORMEROD.

1846 *EDWARD LATHAM ORMEROD, M.D., Old Steyne, Brighton.

1847 WILLIAM EMANUEL PAGE, M.D. Physician to, and Lecturer on Medicine at, St. George's Hospital; Curzon-street, May-fair.

1847 *WILLIAM BOUSFIELD PAGE, Surgeon to the Cumberland Infirmary; Carlisle.

Elected

1840 JAMES PAGET, F.R.S., Assistant-Surgeon to, and Lecturer on General and Morbid Anatomy and Physiology, and Warden of the Collegiate Establishment at, St. Bartholomew's Hospital. C. 1848.

1806 *ROBERT PALEY, M.D., Bishopston-grange, near Ripon, Yorkshire.

1836 S. W. LANGSTON PARKER, Colmore-row, Birmingham.

1847 NICHOLAS PARKER, M.B., Microscopical Demonstrator of Morbid Anatomy at the London Hospital School of Medicine; Finsbury-square.

1841 JOHN PARKIN, M.D., Thurloe-place, West Brompton.

1851 JAMES PART, 7, Camden-road Villas, Camden-town.

1828 RICHARD PARTRIDGE, F.R.S., Surgeon to King's College Hospital, and Professor of Anatomy in King's College, London; New-street, Spring-gardens. S. 1832. C. 1837. V.P. 1847.

1819 GRANVILLE SHARP PATTISON, New York, U.S.

1845 THOMAS BEVILL PEACOCK, M.D., Assistant-Physician to St. Thomas's Hospital; Finsbury-circus, Finsbury-square.

1830 CHARLES P. PELECHIN, M.D., St. Petersburgh.

1819 JOHN PRYOR PEREGRINE, M.D., Jersey.

1839 THOMAS PEREGRINE, M.D., Half-moon-street, Piccadilly.

1831 JONATHAN PEREIRA, M.D. F.R.S. F.L.S., Assistant-Physician to, and Lecturer on Materia Medica at, the London Hospital; Finsbury-square. C. 1844. V.P. 1847.

1844 WILLIAM VESALIUS PETTIGREW, M.D., Chester-street, Grosvenor-place.

1837 BENJAMIN PHILLIPS, F.R.S., Surgeon to, and Lecturer on Surgery at, the Westminster Hospital; Wimpole-street, Cavendish-square. L. 1841. T. 1847.

1814 *EDWARD PHILLIPS, M.D., Physician to the County Hospital; Winchester, Hampshire.

1848 EDWARD PHILLIPS, M.D., Coventry, Warwickshire.

1846 FRANCIS RICHARD PHILP, M.D., Physician to St. Luke's Hospital; Kensington-house, Kensington.

1851 *JAMES HOLLINS PICKFORD, M.D., M.R.I.A., Brighton.

1851 JOHN PICTON, M.D., Wyndham Club, St. James's-square.

Elected

1836 Isaac Pidduck, M.D., Physician to the Bloomsbury Dispensary; Montague-street, Russell-square.

1841 Henry Alfred Pitman, M.D., *Librarian;* Assistant-Physician to, and Lecturer on Materia Medica at, St. George's Hospital; Montague-place, Russell-square.

1850 Alfred Poland, Assistant-Surgeon to Guy's Hospital, and to the Royal Ophthalmic Hospital; St. Thomas's-street, Southwark.

1845 George David Pollock, Surgeon to the North London Eye-Infirmary, and Lecturer on Anatomy at St. George's Hospital Medical School; Grosvenor-street, Grosvenor-square.

1843 Charles Pope, M.D. M.A. F.L.S., Temple Cloud, near Bristol.

1846 Jephson Potter, M.D. F.L.S., Oxford-road, Manchester.

1840 Lewis Powell, John-street, Berkeley-square.

1842 James Powell, M.B. (Lond.), Guilford-street, Russell-square.

1851 Robert Francis Power, M.D., Bolton-street, Piccadilly.

1839 John Propert, New Cavendish-street, Portland-place.

1845 John Pyle, Surgeon to the North London Eye-Infirmary; Oxford-terrace, Hyde-park.

1816 Sir William Pym, M.D., Inspector of Hospitals.

1830 Jones Quain, M.D., Paris.

1850 Richard Quain, M.D., Assistant-Physician to the Hospital for Consumption; Harley-street, Cavendish-square.

1835 Richard Quain, F.R.S., *Treasurer;* Surgeon to University College Hospital, and Professor of Clinical Surgery and of Anatomy in University College, London; Cavendish-square. C. 1838. L. 1846.

1807 John Ramsey, M.D., Physician to the Infirmary at Newcastle.

1821 Henry Reeder, M.D., Ridge House, Chipping, Sudbury.

1835 G. Regnoli, Professor of Surgery in the University of Pisa.

1846 James Reid, M.D., Physician to the Infirmary of St. Giles and Bloomsbury; General Lying-in Hospital, &c.; Brook-street, Grosvenor-square.

1847 Samuel Richards, M.D., Bedford-square.

Elected

1829 Sir John Richardson, Knt. F.R.S. C.B., Surgeon to the Naval Hospital; Haslar Hospital, Gosport.

1849 William Richardson, M.D., Radnor-place, Hyde-park.

1843 Joseph Ridge, M.D., Dorset-square.

1845 Benjamin Ridge, M.D., Putney, Surrey.

1829 *Archibald Robertson, M.D. F.R.S. L. and E., Physician to the General Infirmary, Northampton.

1843 George Robinson, M.D., Newcastle-on-Tyne.

1851 Richard Radford Robinson, Camberwell, Surrey.

1843 William Roden, M.D. F.L.S., Kidderminster, Worcestershire.

1835 George Hamilton Roe, M.D., Physician to, and Lecturer on Medicine at, the Westminster Hospital; Upper Brook-street, Grosvenor-square. C. 1841.

1836 Arnold Rogers, Hanover-square.

1846 William Richard Rogers, M.D., Berners-street, Oxford-street.

1819 Henry Shuckburgh Roots, M.D., Consulting-Physician to St. Thomas's Hospital; Russell-square. C. 1833. V.P. 1834.

1829 William Sudlow Roots, Kingston, Surrey.

1850 George Roper, Guy's Hospital; St. Thomas's-street, Southwark.

1836 Richard Roscoe, M.D., Twickenham, Middlesex.

1835 *Caleb Burrell Rose, Swaffham, Norfolk.

1850 Archibald Colquhoun Ross, M.D., Madeira.

1849 Charles Henry Felix Routh, M.D., Dorset-square.

1845 Henry Mortimer Rowdon, Baker-street, Portman-square.

1841 Richard Rowland, M.D., Assistant-Physician to the Charing-cross Hospital; Woburn-place, Russell-square.

1836 James Russell, Birmingham.

1845 James Russell, jun., Birmingham.

1851 Henry Hyde Salter, M.B., King's College, Strand.

1827 *Thomas Salter, F.L.S., Poole, Dorsetshire.

1844 *Thomas Bell Salter, M.D. F.L.S., Ryde, Isle of Wight.

1842 George Sampson, Chester-street, Belgrave-square.

1849 Hugh James Sanderson, Upper Berkeley-street, Portman-square.

Elected

1847 WILLIAM HENRY OCTAVIUS SANKEY, M.B. (Lond.), London Fever Hospital, Liverpool-road, Islington.

1845 EDWIN SAUNDERS, Surgeon-Dentist to the Queen, and Lecturer on Diseases of the Teeth at St. Thomas's Hospital; George-street, Hanover-square.

1834 LUDWIG V. SAUVAN, M.D., Warsaw.

1840 AUGUSTIN SAYER, M.D., Upper Seymour-street, Portman-square.

1824 EDWARD JAMES SEYMOUR, M.D. F.R.S., Charles-street, Berkeley-square. C. 1826. S. 1827. V.P. 1830.

1840 WILLIAM SHARP, F.R.S. F.G.S. F.R.A.S., Rugby, Warwickshire.

1837 WILLIAM SHARPEY, M.D. F.R.S. L. and E., Professor of Anatomy and Physiology in University College, London; Gloucester-crescent, Regent's-park. C. 1848.

1836 ALEXANDER SHAW, *Vice-President;* Surgeon to, and Lecturer on Surgery at, the Middlesex Hospital; Henrietta-street, Cavendish-square. C. 1842. S. 1843.

1848 *EDWARD JAMES SHEARMAN, M.D., Rotherham, Yorkshire.

1849 FRANCIS SIBSON, M.D. F.R.S., Physician to St. Mary's Hospital; Brook-street, Grosvenor-square.

1848 EDWARD HENRY SIEVEKING, M.D., Assistant-Physician to St. Mary's Hospital; Bentinck-street, Manchester-square.

1839 THOMAS HOOKHAM SILVESTER, M.D., High-street, Clapham.

1842 JOHN SIMON, F.R.S., Lecturer on Pathology at St. Thomas's Hospital; Lancaster-place, Strand.

1821 CHARLES SKENE, M.D., Professor of Anatomy and Surgery; Marischal College, Aberdeen.

1827 GEORGE ROBERT SKENE, Bedford.

1824 FREDERIC CARPENTER SKEY, F.R.S., Assistant-Surgeon to, and Lecturer on Anatomy at, St. Batholomew's Hospital; Surgeon to the Northern Dispensary; Grosvenor-street, Grosvenor-square. C. 1828. L. 1829. V.P. 1841.

1838 HENRY SMITH, Senior Assistant-Surgeon to St. Mary's Hospital; and Lecturer on Surgery in the Medical School adjoining St. George's Hospital; Upper Seymour-street, Portman-square.

Elected

1835 JOHN GREGORY SMITH, Harewood, Yorkshire.

1810 NOEL THOMAS SMITH, M.D., Newcastle-on-Tyne.

1843 ROBERT WILLIAM SMITH, M.D. M.R.I.A., Professor of Surgery in the University of Dublin; Surgeon to the Richmond Hospital; Dublin.

1845 WILLIAM SMITH, Park-street, Bristol.

1847 WILLIAM SMITH, M.D., Weymouth, Dorsetshire.

1850 WILLIAM TYLER SMITH, M.D., Physician-Accoucheur to St. Mary's Hospital; Upper Grosvenor-street, Grosvenor-square.

1843 JOHN SNOW, M.D., Frith-street, Soho-sqnare.

1819 *GEORGE SNOWDEN, Ramsgate, Kent.

1851 JOHN SODEN, Surgeon to the Bath Hospital; Bath, Somerset.

1816 *JOHN SMITH SODEN, New Sidney-place, Bath.

1830 SAMUEL SOLLY, F.R.S., Senior Assistant-Surgeon to St. Thomas's Hospital; St. Helen's-place, Bishopsgate-street. L. 1838. C. 1845. V.P. 1849.

1844 FREDERICK ROBERT SPACKMAN, M.B., Harpenden, St. Alban's.

1834 JAMES SPARK, Newcastle, Staffordshire.

1851 ROBERT JOHN SPITTA, M.B., Clapham, Surrey.

1843 *STEPHEN SPRANGER, Grantham, Lincolnshire.

1838 GEORGE JAMES SQUIBB, Orchard-street, Portman-square.

1815 EDWARD STANLEY, F.R.S., Surgeon to St. Bartholomew's Hospital; Brook-street, Grosvenor-square. C. 1821. S. 1824. V.P. 1827. T. 1832. P. 1843.

1851 JAMES STARTIN, Savile-row, Regent-street.

1842 ALEXANDER PATRICK STEWART, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, the Middlesex Hospital; Grosvenor-street, Grosvenor-square.

1839 THOMAS STONE, M.D., Haydock Lodge Retreat, near Warrington, Lancashire.

1843 ROBERT REEVE STORKS.

1844 JOHN SOPER STREETER, Harpur-street, Red Lion-square.

1847 WILLIAM ALLEN SUMNER, Surgeon to the Portland Town Free Dispensary; Abbey-road, St. John's Wood.

1839 ALEXANDER JOHN SUTHERLAND, M.D. F.R.S., Physician to St. Luke's Hospital; Parliament-street, Westminster. C. 1850.

Elected

1842 James Syme, Professor of Clinical Surgery in the University of Edinburgh; Charlotte-square, Edinburgh.

1844 Richard William Tamplin, Surgeon to the Royal Orthopædic Hospital; Old Burlington-street.

1848 Thomas Hawkes Tanner, M.D., Physician to the Hospital for Women, Red Lion-square; Charlotte-street, Bedford-square.

1840 Thomas Tatum, Surgeon to, and Lecturer on Surgery at, St. George's Hospital; George-street, Hanover-square.

1835 John Colley Taunton, Surgeon to the City of London Truss Society, and to the City Dispensary; Hatton-garden, Holborn. C. 1840.

1845 *John Taylor, M.D., Physician to the Infirmary; Huddersfield.

1845 Thomas Taylor, Vere-street, Cavendish-square.

1817 Frederick Thackeray, M.D., Physician to Addenbrooke's Hospital, Cambridge.

1845 Evan Thomas, Pwllheli, North Wales.

1839 Seth Thompson, M.D., *Secretary;* Physician to, and Lecturer on Medicine at, the Middlesex Hospital; Lower Seymour-street, Portman-square. C. 1849. S. 1850.

1842 Theophilus Thompson, M.D. F.R.S., Physician to the Hospital for Consumption and Diseases of the Chest; Bedford-square.

1835 Frederick Hale Thomson, Berners-street, Oxford-street.

1819 John Thomson, M.D. F.L.S., *Vice-President;* Physician to the Finsbury Dispensary; Dalby-terrace, Islington. C. 1833. L. 1834. V.P. 1850.

1850 Robert Dundas Thomson, M.D., Professor of Chemistry, University of Glasgow.

1836 John Thurnam, M.D., Devizes, Wiltshire.

1848 Edward John Tilt, M.D., Physician to the Farringdon Dispensary; York-street, Portman-square.

1834 Robert Bentley Todd, M.D. F.R.S., *Treasurer;* Physician to King's College Hospital, Professor of Physiology and of General and Morbid Anatomy in King's College, London; New-street, Spring-gardens. L. 1842. T. 1850.

Elected

1828 James Torrie, M.D., Aberdeen.

1843 Joseph Toynbee, F.R.S., Surgeon to the St. George's and St. James's Dispensary, and Aural Surgeon to St. Mary's Hospital; Savile-row, Regent-street.

1850 Samuel John Tracy, Surgeon-Dentist to St. Bartholomew's and Christ's Hospitals; Finsbury-place, Finsbury-square.

1808 Benjamin Travers, F.R.S., Surgeon Extraordinary to the Queen, Surgeon in Ordinary to His Royal Highness Prince Albert; Bruton-street, Bond-street. C. 1810. V. P. 1817. P. 1827.

1841 Matthew Truman, M.D., Norland-square, Notting-hill.

1835 John Cusson Turner, M.D., Brighton.

1845 Thomas Turner, Surgeon to the Royal Manchester Infirmary, and Lecturer on Anatomy; Mosley-street, Manchester.

1846 Alexander Ure, Surgeon to the Westminster General Dispensary, and to St. Mary's Hospital; Grosvenor-street, Grosvenor-square.

1819 Barnard Van Oven, M.D., Consulting Surgeon to the Charity for Delivering Jewish Lying-in Women; Gower-street, Bedford-square.

1806 Bowyer Vaux.

1839 William Randall Vickers, Baker-street, Portman-square.

1814 *John Painter Vincent, Woodland's Kemsing, near Sevenoaks, Kent.

1810 James Vose, M.D.

1828 Benedetto Vulpes, M.D., Physician to the Hospital of Aversa, and to the Hospital of Incurables, Naples.

1841 Robert Wade, Surgeon to the Westminster General Dispensary; Dean-street, Soho.

1823 William Wagner, M.D., Berlin.

1820 Thomas Walker, M.D., Physician to the Forces; Lower Seymour-street, Portman-square.

1851 Henry Haynes Walton, Assistant-Surgeon to St. Mary's Hospital; Grosvenor-street, Grosvenor-square.

1846 Nathaniel Ward, Assistant-Surgeon to, and Demonstrator of Anatomy at, the London Hospital; Broad-street-buildings, City.

1845 Thomas Ogier Ward, M.D., Leonard-place, Kensington.

Elected

1821 WILLIAM TILLEARD WARD, York-place, Portman-square.

1846 JAMES THOMAS WARE, Surgeon to the Finsbury Dispensary; and to the Convalescent Institution, Russell-square.

1811 JOHN WARE, Clifton, near Bristol.

1814 MARTIN WARE, Russell-square. C. 1844. T. 1846.

1816 *CHARLES BRUCE WARNER, Cirencester, Gloucestershire.

1829 ELIAS TAYLOR WARRY, Wimborne, Dorsetshire.

1837 THOMAS WATSON, M.D., Henrietta-street, Cavendish-square. C. 1840. V.P. 1845.

1847 *THOMAS WATSON, Holbeach, Lincolnshire.

1840 WILLIAM WOODHAM WEBB, Gislingham, near Thwaite, Suffolk.

1842 FREDERIC WEBER, M.D., Physician to the St. George's and St. James's Dispensary; Norfolk-street, Park-lane.

1835 JOHN WEBSTER, M.D. F.R.S., Consulting Physician to the St. George's and St. James's Dispensary; Brook-street, Grosvenor-square. C. 1843.

1844 WILLIAM WEGG, M.D., Physician to the St. George's and St. James's Dispensary; Maddox-street, Hanover-square.

1816 SIR AUGUSTUS WEST, Knt., Deputy-Inspector of Hospitals to the Portuguese Forces; Paris.

1842 CHARLES WEST, M.D., Lecturer on Midwifery at St. Bartholomew's Hospital; Wimpole-street, Cavendish-square.

1841 THOMAS WEST, M.D. F.L.S., Daventry.

1828 JOHN WHATLEY, M.D.

1849 JOHN WHITE, The Albany, Piccadilly.

1840 JOSEPH WICKENDEN, Birmingham.

1824 *WILLIAM JOHN WICKHAM, Surgeon to the Winchester Hospital; Winchester.

1844 FREDERICK WILDBORE, High-street, Shoreditch.

1837 GEORGE AUGUSTUS FREDERICK WILKS, M.D., Temple-walk, Matlock, Derbyshire.

1840 CHARLES JAMES BLASIUS WILLIAMS, M.D. F.R.S., Holles-street, Cavendish-square. C. 1849.

1829 ROBERT WILLIS, M.D., Barnes, Surrey. L. 1838.

1839 ERASMUS WILSON, F.R.S., Consulting Surgeon to the St. Pancras Infirmary; Henrietta-street, Cavendish-square.

Elected

1839 James Arthur Wilson, M.D., Physician to St. George's Hospital; Dover-street, Piccadilly. C. 1846.

1831 William James Wilson, Surgeon to the Manchester Infirmary; Manchester.

1850 *Robert Stanton Wise, M.D., Banbury, Oxon.

1825 Thomas Alexander Wise, India.

1851 John Wood, Haymarket.

1841 George Leighton Wood, Surgeon to the Bath Hospital; Queen-square, Bath.

1848 William Wood, M.D., Resident Medical Officer, Bethlem Hospital.

1843 John Ward Woodfall, M.D., Assistant-Physician to the Westminster Hospital; Davies-street, Berkeley-square.

1847 Robert Woollaston, Conduit-street, Westbourne-terrace.

1833 Thomas Wormald, Assistant-Surgeon to St. Bartholomew's Hospital; Bedford-row. C. 1839.

1842 William Collins Worthington, Surgeon to the Infirmary, Lowestoft, Suffolk.

1848 Edward John Wright, Kennington-row, Kennington.

[It is particularly requested, that any change of Title or Residence may be communicated to the Secretaries before the 1st of August in each year, in order that the List may be made as correct as possible.]

HONORARY FELLOWS.

(Limited to Twelve.)

Elected

1841 WILLIAM THOMAS BRANDE, F.R.S. L. and ED., Professor of Chemistry at the Royal Institution of Great Britain; Royal Mint, Tower-hill.

1835 SIR DAVID BREWSTER, K.H. LL.D. F.R.S. L. and E., &c., Cor. Mem. Institute of France, &c.; Kingussie.

1841 ROBERT BROWN, D.C.L. F.R.S., Vice-President of the Linnean Society; British Museum.

1835 The Very Rev. WILLIAM BUCKLAND, D.D. F.R.S., Dean of Westminster.

1847 EDWIN CHADWICK, Commissioner of the Board of Health.

1835 MICHAEL FARADAY, D.C.L. F.R.S., Cor. Memb. Institute of France; Royal Institution.

1841 SIR JOHN FREDERICK WILLIAM HERSCHEL, Bart., D.C.L. F.R.S., President of the Royal Astronomical Society; Somerset-House.

1835 SIR WILLIAM JACKSON HOOKER, LL.D. F.R.S. L. and E., Royal Botanic Garden, Kew.

1847 RICHARD OWEN, F.R.S., Cor. Memb. Institute of France; Hunterian Professor to, and Curator of the Museum of, the Royal College of Surgeons of England.

1835 The Rev. ADAM SEDGWICK, A.M. F.R.S. &c., Woodwardian Lecturer, Cambridge.

1841 The Rev. WILLIAM WHEWELL, D.D. F.R.S., Master of Trinity College, Cambridge.

FOREIGN HONORARY FELLOWS.

(Limited to Twenty-four.)

Elected

1841 G. ANDRAL, M.D., Professor in the Faculty of Medicine, Paris.

1815 PAOLO ASSALINI, M.D., Professor of Surgery, and Chief Surgeon to the Military Hospital at Milan, &c.

1835 CARL JOHAN ECKSTRÖM, K.P.S. and W., Physician to the King of Sweden, First Surgeon to the Seraphim Hospital, Stockholm.

1835 W. J. EDWARDS, M.D. F.R.S., Member of the Institute of France, Paris.

1841 CHRISTIAN GOTTFRIED EHRENBERG, Berlin.

1835 BARON A. DE HUMBOLDT, Member of the Institute of France, &c.; Berlin.

1841 JAMES JACKSON, M.D., Professor of Medicine in the University of Cambridge, Boston, U.S.

1843 BARON JUSTUS LIEBIG, M.D. F.R.S., Professor of Chemistry in the University of Giessen, &c.

1841 P. C. A. LOUIS, M.D., Physician to the Hôtel-Dieu, Member of the Royal Academy of Medicine, &c., Paris.

1841 F. MAGENDIE, M.D., Member of the Institute; Physician to the Hospital of the Salpêtrière; Paris.

1847 PROFESSOR CARLO MATTEUCCI, University of Pisa.

1841 JOHANN MÜLLER, M.D., Professor of Anatomy and Physiology, and Director of the Royal Anatomical Museum, Berlin.

1835 J. C. OERSTED, M.D., Professor of Physics in the University of Copenhagen, &c. &c.

1835 PROFESSOR ORFILA, Dean of the Faculty, &c. &c., Paris.

1841 BARTOLOMEO PANIZZA, M.D., Pavia.

1850 CARL ROKITANSKY, M.D., Curator of the Imperial Pathological Museum at the University of Vienna, &c. &c.

Elected

1843 PHILIBERT JOSEPH ROUX, Member of the French Institute; Surgeon in Chief of the Hôtel-Dieu; Professor in the Faculty of Medicine, Paris.

1835 C. J. TIMMINCK, Director of the Museum of Natural History of the King of Holland, Amsterdam.

1835 FREDERICK TIEDEMANN, M.D., Professor of Anatomy and Physiology, Heidelberg.

1841 JOHN C. WARREN, M.D., Professor of Anatomy and Surgery in the University of Cambridge, Boston, U.S.

CONTENTS.

PAGE

List of Officers and Council - - - - - v

List of Referees - - - - - - - vii

List of Presidents of the Society - - - - - viii

List of Fellows of the Society - - - - - - ix

I. History of a successful case of Ovariotomy. By E. W. Duffin, Surgeon. With a Description of the Morbid Anatomy of the Sac. By Robert Lee, M.D. F.R.S., Fellow of the Royal College of Physicians, Physician to the British Lying-in Hospital, Physician-Accoucheur to the St. Mary-le-Bone Infirmary, Lecturer on Midwifery and the Diseases of Women and Children at St. George's Hospital - - - - 1

II. An Analysis of 108 Cases of Ovariotomy, which have occurred in Great Britain, with Appendix. By Robert Lee, M.D. F.R.S., Fellow of the Royal College of Physicians, Physician to the British Lying-in Hospital, Physician-Accoucheur to the St. Mary-le-Bone Infirmary, Lecturer on Midwifery and the Diseases of Women and Children at St. George's Hospital - 10

III. A Case of Softening of the Spinal Marrow in a boy affected with Chorea. By Robert Nairne, M.D., Physician to, and Lecturer on Medicine at, St. George's Hospital - - - - 37

IV. Case illustrating the difficulties of Diagnosis of Morbid Growths from the Upper Jaw: with Remarks. By Prescott Hewett, Assistant Surgeon to St. George's Hospital, and Lecturer on Anatomy - - - - - - 43

V. Cases of Rupture of the Liver or Spleen: with Remarks. By Athol Johnson, Fellow of the Royal College of Surgeons, Surgeon to the St. George's and St. James's Dispensary, and Lecturer on Physiology and General Anatomy at St. George's Hospital - - - - - - 53

VI. Account of a case in which the Cæsarean Section was performed; with Remarks on the peculiar sources of Danger attendant on the Operation. By Charles West, M.D., Physician-Accoucheur to St. Bartholomew's Hospital, and Lecturer on Midwifery in the Medical College - - - - - 61

PAGE

VII. A Case of Cæsarean Section. By Dr. Oldham, Obstetric Physician and Lecturer on Midwifery, &c., at Guy's Hospital - 89

VIII. Case of Extensive Necrosis of the Bones of the Cranium and removal of large portions thereof. By John Drummond, F.R.M.C.S., Deputy Inspector of Hospitals, Melville Naval Hospital, Chatham - - - - - 103

IX. An account of a Case of Fracture and Distortion of the Pelvis, combined with an unusual form of Dislocation of the Femur. By Charles Hewitt Moore, Surgeon to the Middlesex Hospital. (With Two Woodcuts) - - - - 107

X. Experiments on Chylous or Chylo-Serous Urine. By John Mayer, Esq., Assistant Surgeon to the Second Native Veteran Battalion. With a History of the Patient. By George Pearse, M.D., Garrison-Surgeon of Bangalore. Communicated by H. Bence Jones, M.D. F.R.S. - - - 119

XI. Cases illustrating some Difficulties in the Diagnosis of Pleuritic Effusion. By T. A. Barker, M.D., Physician to, and Lecturer on the Practice of Medicine at, St. Thomas's Hospital - 131

XII. Case of Popliteal Aneurism treated by Compression, with some Remarks upon this method of treating Aneurism, and a List of the Cases in which it has been employed in Dublin. By O'Bryen Bellingham, M.D., Fellow of, and Member of the Court of Examiners of, the Royal College of Surgeons in Ireland, Surgeon to St. Vincent's Hospital, &c., &c. Communicated by Sir Benjamin Brodie, Bart., F.R.S. - - 143

XIII. Account of the Dissection of a case in which Two Popliteal Aneurisms had been treated by Compression of the Femoral Arteries. By Prescott Hewett, Assistant Surgeon to St. George's Hospital, and Lecturer on Anatomy, &c. - - 161

XIV. On the Relation of Sleep to Convulsive Affections. By William Frederick Barlow, M.R.C.S., Resident Medical Officer to the Westminster Hospital - - - - 167

XV. On Fatty Degeneration of the Placenta, and the Influence of this Disease in producing Abortion, Death of the Fœtus, Hæmorrhage, and Premature Labour. By Robert Barnes, M.D. (Lond.), Obstetric Surgeon to the Western General Dispensary, and Lecturer on Midwifery. Communicated by Professor Murphy. (With Two Plates) - - - 183

XVI. On some Secondary Physiological Effects produced by Atmospheric Electricity. By C. F. Schönbein, Professor of Chemistry at Bâsle, &c., &c. Communicated by M. Faraday, D.C.L. F.R.S., Professor of Chemistry at the Royal Institution, Honorary Fellow of the Medical and Chirurgical Society - 205

PAGE

XVII. On the Employment of the Heat of Electricity in Practical Surgery. By John Marshall, F.R.C.S., Assistant-Surgeon to the University College Hospital. Communicated by Richard Quain, Esq., F.R.S. - - - - - 221

XVIII. A Case of Strangulated Obturator or Thyroideal Hernia, successfully relieved by Operation. By Henry Obré, formerly Assistant-Surgeon to the St. Mary-le-Bone Infirmary. Communicated by Professor Erichsen - - - 233

XIX. Some Observations on the Pathology of those Affections of the Ear which produce Disease in the Brain. By Joseph Toynbee, F.R.S., Fellow of the Royal College of Surgeons in England, Aural Surgeon to St. Mary's Hospital, and Consulting Surgeon to the St. George's and St. James's General Dispensary. (With Four Woodcuts) - - - - - - 239

XX. A Case of Obstruction of the Colon, relieved by an Operation performed at the Groin. By James Luke, Senior Surgeon to the London and St. Luke's Hospitals, Lecturer on Surgery, and Member of the Council of the Royal College of Surgeons of England, &c., &c. Communicated by James Moncrieff Arnott, F.R.S. - - - - - 263

XXI. On the Variations of the Sulphates and Phosphates excreted in Acute Chorea, Delirium Tremens, and Inflammation of the Brain. By H. Bence Jones, M.D. A.M. (Cantab.), F.R.S. F.C.S., Physician to St. George's Hospital - - 277

XXII. Account of a case in which a Large Cyst containing Hydatids was developed at the Root of the Neck, death ensuing from Rupture of the Left Subclavian Artery. By James Dixon, Surgeon to the Royal London Ophthalmic Hospital, and Assistant-Surgeon to St. Thomas's Hospital - - 315

XXIII. A Case of Aneurismal Dilatation of the Posterior Tibial Vein, communicating indirectly with the Upper Part of the Popliteal Artery. By Edward Cock, Surgeon to Guy's Hospital. (With One Woodcut) - - - - - - 327

XXIV. On a New Method of Treatment applicable to certain Cases of Epiphora. By William Bowman, F.R.S., Professor of Physiology and of General and Morbid Anatomy in King's College, Assistant-Surgeon to the King's College Hospital, and to the Royal London Ophthalmic Hospital - - - 337

Donations to the Library - - - - - - 347

Index - - - - - - - 355

ADVERTISEMENT.

THE Council of the Royal Medical and Chirurgical Society deems it proper to state, that the Society does not hold itself in any way responsible for the statements, reasonings, or opinions set forth in the various papers, which, on grounds of general merit, are thought worthy of being published in its Transactions.

HISTORY OF A

SUCCESSFUL CASE OF OVARIOTOMY.

BY

E. W. DUFFIN, SURGEON.

WITH A DESCRIPTION OF

THE MORBID ANATOMY OF THE SAC.

BY

ROBERT LEE, M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
PHYSICIAN TO THE BRITISH LYING-IN HOSPITAL,
PHYSICIAN-ACCOUCHEUR TO THE ST. MARY-LE-BONE INFIRMARY,
LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN
AT ST. GEORGE'S HOSPITAL.

Received September 19th.—Read November 12th, 1850.

On the 23d of August last, a woman, 38 years of age, and whose general health was in every respect unimpaired, applied to me for the purpose of having an Ovarian Cyst extirpated. The tumour completely filled the abdomen, and in so uniform a manner, that it was impossible to determine in which ovary it was seated; though, from the imperfect history the patient gave of the commencement of her disease, there was reason to believe that the left ovarium was the organ affected. The patient presented the appearance of a woman who had completed her eighth month of pregnancy, and stated that the abdomen had attained this size in the course of seven or eight months; as previous to the early part of the year no visible enlargement of the region existed; nor was she in any way aware that she was the subject of

the tumour in question. The progress of the disease, therefore, seemed to be more than usually rapid, and was, moreover, complicated with frequent and severe attacks of neuralgia in the outer and lower third of the right thigh; caused, as was afterwards proved, by the pressure of the cyst on the corresponding sciatic nerve. The tumour could easily be moved by manipulation of the abdominal parietes; and, so far as could be ascertained by such means, was free from adhesions likely to interfere with its extirpation. The woman was herself very urgent, and impatient to get rid of the disease, though made fully aware by myself and others of the extreme danger that would attend the operation. She was, however, a person of strong nerve, and very determined character; fully impressed, moreover, in her own mind, that the operation would not prove fatal; a circumstance which had great weight in determining me to yield to her solicitations.

On the 27th of the month, the patient took a dose of active purgative medicine, in order to evacuate her bowels very completely, and render it unnecessary to administer any further aperient for several days. On the following afternoon, assisted by Messrs. Fergusson, Ure, and Henry Smith, and in the presence of Dr. Barker, of St. Thomas's Hospital, I proceeded to remove the sac, Dr. Snow having kindly undertaken to administer chloroform beforehand; the temperature of the apartment was raised to about 80° of Fahrenheit.

The patient being placed in a reclining position at the edge of her bed, was supported behind by Mr. Ure, who, by passing his arms round her body, kept up the necessary amount of support by compressing the abdomen on each side with both hands, so as to compensate for the loss of support to the viscera, in proportion as the sac discharged its contents. An incision was made into the abdomen in the course of the *linea alba*, midway between the umbilicus and pubes, but only of sufficient size to admit the forefinger, that the surface of the tumour might be first carefully examined by this means, and its freedom from adhesions likely to frustrate the future steps of the operation ascertained. The tumour

was found to be unattached at all points except its base: here the attachment was extensive, involving the whole length of the broad ligament, which in the course of the disease, as afterwards appeared, had become considerably elongated. The opening in the abdominal parietes was then enlarged by means of a director and bistoury, till the length was nearly three inches. The contents of the sac, amounting to 130 fluid ounces, were then evacuated by means of a trocar introduced at the commencement of the lower third of the tumour. As the thick, viscid, ropy, light brown-coloured fluid escaped, the parietes of the cyst were carefully drawn by a rotary movement through the opening in the abdomen. At this part of the operation some difficulty was experienced in consequence of the sac containing within its parietes a secondary cyst about the size of an ordinary orange, and which was found afterwards to contain rather more than two ounces of the same kind of viscid fluid. This sac, had it been a trifle larger, must of necessity have been perforated by slitting open, to a certain extent, the primary cyst, and again using the trocar. The tumour being now entirely out of the abdomen, was found to be attached at its base, by a neck of an inch and a half, or thereabouts, in length. On examining this carefully, three large arteries and one considerable vein were discovered. Between the roots of these a needle was passed armed with a double ligature, formed of three threads of strong silk, and tied on each side. A general ligature was then passed round the whole neck externally, for greater safety, and the tumour was separated by means of a pair of knife-edged scissors.

Reflecting on the two great causes of death, in unsuccessful cases of Ovariotomy, and the three several periods at which a fatal termination may occur,—viz. either within forty-eight hours, owing to the direct shock of the operation; a day or two later, from inflammation of the peritoneum arising from wounding this membrane; or at a still later period, caused, as it appears, on the separation of the slough by putrefactive

decomposition within the peritoneal cavity;—it suggested itself to me, that this latter consequence, as well as the irritation created by the ligature remaining in the abdomen, might be obviated by keeping the tied portion completely out of this cavity. I determined, therefore, to do so, by stitching the cut extremity and ligature in the wound, so as to prevent their receding into the pelvis, and to retain them in that situation till the ligature should come away, and the wound, if it previously closed, reopen to let the slough escape. Had the neck of the cyst been longer, it was my intention to have kept the whole portion included in the ligature entirely *outside the abdominal parietes*, by passing a long needle through it, exterior to the surface; but not being of a length sufficient to admit of this, the above plan was substituted, and I have great satisfaction in saying that it answered every expectation; the wound healing up entirely by the first intention, and afterwards, on the *ninth* day, opening, for the purpose of allowing the ligature and slough to escape on the *fifteenth;* then continuing to suppurate for a few days, till the reopened part finally closed on the twenty-second day. The only objection to this plan was the disagreeable dragging, of which the patient afterwards complained, occasioned by the abdominal parietes being, as it were, tied down to the spine. On the separation of the ligature the abdomen resumed its naturally round contour, and the dragging sensation gradually ceased, disappearing altogether in about a fortnight. Could it have been ascertained with sufficient certainty beforehand, that the seat of disease was the left ovarium, the opening through the abdominal parietes might have been made through the fascia transversalis, at a point more directly over the base of the tumour; the distance between the ligature and external opening would then have been considerably less, and the disagreeable dragging, in all probability, would have been obviated. In the present instance it appears, that the separated end of the neck of the cyst formed no adhesion to the peritoneum, though kept in contact with that membrane during fourteen days; or at least none of sufficient strength

to resist the subsequent elevation of the abdomen, as nothing of the kind could, after that time, be detected; the intestines having to all appearance resumed their proper situation, and the form of the body its natural roundness. Had the attachment continued, a permanent band crossing the pelvis in an oblique direction would have existed, around which the intestines might have coiled, and become the seat of internal hernia.

Treatment.—Shortly after the patient was put to bed, she took two grains of opium, and passed a good night. The next morning (29th) I found her with a tranquil, soft, regular pulse (76); moist, though somewhat white, tongue, the effect of the opium; perspiring skin, and cheerful countenance; there was no tenderness of abdomen, and the wound was uniting. To prevent the necessity of her stirring from the position in which she had been placed, the bladder was emptied by means of the catheter, and two grains of opium were again administered, her diet being restricted to tea, bread and butter, and water gruel. She passed the day tranquilly; sleeping soundly, or dosing the greater part of the time. At night, the urine was again drawn off, and two grains more of opium were given. The same phenomena presented themselves daily, and the same treatment was pursued, till the fifth morning, when she complained a good deal of the dragging uneasiness already alluded to; the abdomen was somewhat tumid from flatulence, and tender to the touch; pulse 86, but soft. A copious enema of salt and water was carefully injected, and the bowels by this means being speedily emptied on a sheet doubled and passed under her as she lay, that the position she had preserved since the operation might not in any way be disturbed, the tenderness soon subsided, and in the afternoon I found her as well as on the preceding days. The opium was repeated; she slept well, and in the morning had not an untoward symptom. The enema was again administered with advantage, and at night the opium. She was now allowed

some chicken broth. Every morning an injection was given; the opiate, however, was discontinued on the seventh night. The wound healed by the first intention; but on the ninth day its lower fourth began to reopen, and discharged fetid matter. On the fifteenth day the ligature and a part of the slough came away. In the course of the following week the remainder of the slough was discharged along with the matter secreted by the edges of the wound; and on the twenty-second day the whole was healed. The enemata were discontinued after the fifteenth day; the patient then rose to the night-chair. On the eighteenth she was able to get up and move about her room, but complained of faintness, which gradually went off as she became accustomed to the change of position. Since the above date she has daily gained strength, and been for some weeks past engaged in her usual occupation, that of a ladies' dressmaker.

DISSECTION OF THE CYST.

BY

ROBERT LEE, M.D. F.R.S.

An Ovarian Cyst, which contained two gallons of thick, viscid, brownish fluid, was removed by Mr. Duffin through an opening in the abdominal parietes, on the 27th of August last. The following is an anatomical description of the walls of this cyst. They are composed of three distinct coats or layers. First, a peritoneal covering; secondly, a middle fibrous coat; and thirdly, a dense membranous sac, in which the fluid had been contained.

At the pedicle or root of the cyst, the peritoneal coat has been divided by an incision an inch and a half in length. The cut ends of three considerable arteries and one large

vein are seen in this opening, and likewise the divided extremity of the fallopian tube. The peritoneum is here thin, and adheres loosely by cellular membrane to the middle coat; but over the whole of the remaining portion of the cyst, the peritoneum is thick, opaque, and adheres firmly to the tissue below. The peritoneal covering of the cyst does not essentially differ from the peritoneum, which invests the pelvic and abdominal viscera, with which it had evidently been continuous. The fallopian tube, about a foot in length, extends from the pedicle or root to the opposite extremity of the cyst, where it is seen terminating in the corpus fimbriatum.

The middle coat of the cyst is thick at the pedicle, and has been separated into several distinct strata or layers, to which numerous branches of arteries are distributed. With these arteries are observed, proceeding to the middle coat, numerous trunks and branches of nerves with ganglionic enlargements. The middle coat becomes thinner as it extends outward from the root to the apex of the cyst, where it presents the appearance of a very dense fibrous membrane, which closely adheres both to the peritoneum and the internal coat of the cyst. In the preparation, these three layers at this extremity are seen entirely separated from one another, and constituting three perfectly distinct structures.

The internal coat of the cyst is firm and thick, and presents on its inner surface a rough, irregular, puckered appearance, which, in some spots, has a brown or yellowish colour. Little difficulty was experienced in detaching the internal from the middle coat at the root, but at the apex they adhered very firmly to one another, as did the middle to the peritoneal coat. The first attempt to divide the internal coat of the cyst into two distinct membranes was not successful; but at the suggestion of Mr. Henry Charles Johnson, on the 8th inst., who then expressed his conviction, that it would be found to consist of two perfectly distinct membranous layers, like the wall of the Graafian vesicle,

I renewed the attempt with the forceps and point of the scissors, while the parts were immersed in rectified alcohol, and succeeded in clearly demonstrating that the inner coat of the cyst is not a simple membrane, but consists of two distinct membranous layers, like the wall of the Graafian vesicle.

Imbedded in the middle coat, near the root, is another and much smaller cyst with a lining membrane, which presents, on the inner surface, precisely the same appearances as those seen on the inner surface of the larger cyst. The lining membrane of this smaller cyst is likewise composed of two distinct layers, like that of the larger cyst and the Graafian vesicle, both before and after the escape of the ovum. From the preparation, it is seen that a thin stratum of the middle coat is interposed between these two cysts, and that they are independent of each other. But the smaller cyst, though not adherent to the outer surface of the larger, has grown so as to encroach on the cavity of the latter, the lining membrane of which smaller cyst has protruded before it. From this dissection it is obvious, that the smaller cyst did not grow from the inner surface of the larger, nor from its outer surface; but that in the progress of development of the smaller cyst, it pushed before it a portion of the lining membrane of the larger, and thus acquired the layer of reflected membrane from the inner coat of the larger cyst by which it is invested.

At the base or root of the great cyst in the middle fibrous coat, between the outer surface of the smaller cyst and peritoneum, there is a group of small multilocular cysts, which contained similar fluid, have all the same structure, and bear the same relation to one another, as the two cysts above described. These multilocular cysts have evidently been formed independently of each other; but in the progress of their growth and enlargement, some of them have encroached upon the cavities of those cysts with which they were contiguous, and in the same mechanical manner have acquired reflected portions of their membranes.

The walls of this Ovarian Cyst, which I have now described, contain all the elementary structures which enter into the composition of the human ovarium in the healthy condition, peritoneum, stroma and Graafian vesicles, with blood-vessels and ganglionic nerves;—whether all multilocular cysts are formed in the same manner, future observation must determine.

AN ANALYSIS OF

108 CASES OF OVARIOTOMY,

WHICH HAVE OCCURRED IN

GREAT BRITAIN.

BY

ROBERT LEE, M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
PHYSICIAN TO THE BRITISH LYING-IN HOSPITAL,
PHYSICIAN-ACCOUCHEUR TO THE ST. MARY-LE-BONE INFIRMARY,
LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN,
AT ST. GEORGE'S HOSPITAL.

Received October 30th.—Read November 12th, 1850.

Dr. Nathan Smith, Professor of Physic and Surgery in Yale College, Connecticut, published, in the 'Edinburgh Medical and Surgical Journal' for 1822, the history of a "Case of Ovarian Dropsy, successfully removed by a Surgical Operation." There was a large tumour in the right side of the abdomen, which was moveable to a considerable extent, and in which a distinct fluctuation could be perceived. "The patient being placed on a bed," observes Dr. Smith, "with her head and shoulders somewhat raised, an assistant pushed up the tumour to the middle of the abdomen, and held it there. I then commenced an incision about an inch below the umbilicus, directly in the linea alba, and extended it downwards three inches. I carried it down to the peritoneum, and there stopped till the blood had ceased to flow, which it soon did. The peritoneum was then divided the whole extent of the external incision. The tumour, now exposed to view, was punctured; a canula was introduced, and seven pints of a dark-coloured ropy fluid were discharged into a vessel. About one pint was lost, so

that the whole was about eight pounds. Previous to puncturing the tumour, by introducing the finger by the side of it, I ascertained that it adhered for some extent to the parietes of the abdomen, on the right side, between the spine of the ilium, and the false ribs. After evacuating the fluid, I drew out the sac, which brought out with it, and adhering to it, a considerable portion of omentum. This was separated from the sac by the knife; and two arteries, which we feared might bleed, were tied with leather ligatures, and the omentum was returned. By continuing to pull out the sac, the ovarian ligament was brought out; it was cut off; two small arteries were secured as before, and the ligament returned. I then endeavoured to separate the sac from its adhesions to the parietes of the abdomen, which occupied a space about two inches square. This was effected by a slight touch of the knife, at the anterior part of the adhesion, and by the use of the fingers. The sac then came out whole, excepting where the puncture had been made, and I should think it might weigh between two and four ounces. The incision was then closed with adhesive plaster, and a bandage applied round the abdomen. No unfavorable symptoms occurred after the operation. In three weeks the patient was able to sit up and walk, and since has perfectly recovered."

This operation, similar in the first stage to the Cæsarean section, but much less formidable, was undertaken by Professor Smith, from the following considerations:—"The patient, although her health was not greatly injured, was sensibly affected by the disease. She was quite certain that the increase of the tumour in a given time was augmented, and probably, at no distant time, would destroy her.—I had also an opportunity to dissect the body of a patient who had died of ovarian dropsy, after having been tapped seven times. In this case, the sac was found to be the right ovarium, which filled the whole abdomen, but adhered to no part, except the proper ligament, which was not larger than the finger.—I have seen two other ovarian sacs which were taken from patients after death; they had been tapped

several times, and the sacs were equally unattached, except to their own ligaments. Thence I inferred, that in a case of ovarian dropsy, while the tumour remained moveable, it might be removed with a prospect of success; and the event has justified my expectations. The mode of operating in the above case has been described in several of my last courses of 'Lectures on Surgery.'"

In the following year, 1823, Mr. John Lizars, of Edinburgh, made a long incision through the abdominal parietes of a woman, aged 27, who, in the opinion of some of the most experienced physicians in that city, was afflicted with ovarian disease; but the symptoms were produced by obesity and distension of the intestines, and there was no ovarian cyst or tumour found present to remove, on laying open the abdomen. This patient did not die from the operation. In 1825 Mr. Lizars removed an enlarged ovarium by a long incision from another patient. Some hæmorrhage followed the operation. The other ovarium was diseased, and was not removed. In 1825 Mr. Lizars operated in another case, and the results were fatal. In 1826 Mr. Lizars repeated the operation, but he encountered a vascular tumour which could not be removed. In 1826 Dr. Granville made an incision of nine inches and a half through the abdominal parietes of a woman who had an ovarian cyst; but the adhesions were so strong, that the operation was abandoned. In 1827 Dr. Granville repeated the operation, but there was no ovarian tumour to remove. Some time after this, it was proposed again to perform the operation; but the consent of the patient could not be obtained, and she died some years after under the care of Dr. Scott, of Stratton Street. Both ovaria were sound; and the enlargement arose from a great vascular tumour imbedded in the walls of the uterus. The preparation of the uterus and tumour is in the Museum of St. George's Hospital.

The difficulty, or rather the impossibility, of determining whether ovarian cysts and tumours were present in these cases, and whether, when they actually existed, their extirpation was practicable, were strikingly illustrated by these

operations; and during six years after their performance ovariotomy was almost wholly abandoned in this country. In 1833 the operation, as performed by Dr. N. Smith, was revived by Mr. Jeaffreson, of Framlingham, who made an incision one inch and a half to two inches between the umbilicus and pubes, through the abdominal parietes of a patient, exposed an ovarian cyst, which had no adhesions, and after emptying the cyst by tapping, drew it out, tied and excised the root. During the last twenty-seven years the operation of ovariotomy has been attempted or performed more than one hundred and thirty times in Great Britain. Of 108 cases I have obtained authentic reports; and now beg leave to present an Analysis of these to the Royal Medical and Chirurgical Society. In about one third of these cases there was either no ovarian cyst or tumour to remove, or there were present ovarian cysts and tumours the removal of which was found to be impracticable. It is demonstrated by the following Analysis of 108 Cases of Ovariotomy, that in about one third of the whole number, before an opening had been made into the sac of the peritoneum, it was impossible to determine whether any ovarian disease actually existed; or whether, when ovarian cysts and tumours were present, it was possible to extirpate them by a surgical operation.

Postscript.

Since the preceding paper was presented to the Society, details more or less complete have been obtained, of 54 additional cases of Ovariotomy which have occurred in Great Britain. An analysis of these has been appended to the table, making, in all, 162 cases in which the operation has been undertaken. In 60 the ovarian disease could not be removed; 19 of these proved fatal. Of the remaining 102 cases in which the operation was completed, 42 terminated fatally. The present condition of the 60 patients who recovered is very imperfectly known.

Analysis of 162 *Cases of Ovariotomy which have occurred in Great Britain.*

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
1	1823, Oct. 24.	27	Enlargement commenced 1815; long incision; no ovarian cyst or tumour; the enlargement produced by obesity and distension of the intestines. (Observations on Extraction of Diseased Ovaria; J. Lizars, Esq. Edin., 1825.)	J. Lizars, Esq.	No ovarian disease to be removed.	Recovered from the operation.
2	1825, Feb. 27.	36	One enlarged ovarium removed by a long incision; the other ovarium diseased and not removed. Some hæmorrhage followed the operation. The ligature had not come away when the history of the case was published. (Ibid.)	J. Lizars, Esq.	Removed: other ovarium diseased not removed.	Recovered from the operation.
3	1825, March 22.	25	Ovarian tumour seven pounds, adhering to the brim of the pelvis, colon, and abdominal walls, which were partly overcome by dissection, tension, and the handle of the scalpel; incision from sternum to symphysis pubis. Gangrene of the intestine followed. (Ibid.)	J. Lizars, Esq.	Removed.	Died.
4	1825.	34	A solid and vascular fibrous tumour of the uterus, adhering to the omentum majus. (This patient died in 1850. Both ovaria were found healthy. The fibrous tumour adhered to the fundus uteri.) (Ibid.)	J. Lizars, Esq.	No ovarian disease to be removed.	Recovered from the operation.
5	. . . .	..	A case, similar to the first of these, was seen by Dr. Gooch about 1829 in Guy's Hospital. The patient, a young woman, had been in the hospital some time before, for what was considered ovarian dropsy; but purgatives removed the tumour. A few months before I saw her, having a return of the enlargement, she consulted an enterprising surgeon, who assured her that she had a tumour in the ovary, which could be removed only by extirpation; for this purpose he made an incision in the linea alba six inches long, by which the cavity of the abdomen was exposed. It was then discovered, as in the case at Edinburgh, that there was no tumour, and that the enlargement depended on flatulence and fat; the wound was closed and healed; but the patient's health sustained great injury. (See Dr. Gooch's Account, &c., p. 222.)	Unknown.	No ovarian disease to be removed.	Recovered from the operation.

Analysis of 162 *Cases of Ovariotomy which have occurred in Great Britain.*

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
1	1823, Oct. 24.	27	Enlargement commenced 1815; long incision; no ovarian cyst or tumour; the enlargement produced by obesity and distension of the intestines. (Observations on Extraction of Diseased Ovaria; J. Lizars, Esq. Edin., 1825.)	J. Lizars, Esq.	No ovarian disease to be removed.	Recovered from the operation.
2	1825, Feb. 27.	36	One enlarged ovarium removed by a long incision; the other ovarium diseased and not removed. Some hæmorrhage followed the operation. The ligature had not come away when the history of the case was published. (Ibid.)	J. Lizars, Esq.	Removed: other ovarium diseased not removed.	Recovered from the operation.
3	1825, March 22.	25	Ovarian tumour seven pounds, adhering to the brim of the pelvis, colon, and abdominal walls, which were partly overcome by dissection, tension, and the handle of the scalpel; incision from sternum to symphysis pubis. Gangrene of the intestine followed. (Ibid.)	J. Lizars, Esq.	Removed.	Died.
4	1825.	34	A solid and vascular fibrous tumour of the uterus, adhering to the omentum majus. (This patient died in 1850. Both ovaria were found healthy. The fibrous tumour adhered to the fundus uteri.) (Ibid.)	J. Lizars, Esq.	No ovarian disease to be removed.	Recovered from the operation.
5	. . . .	..	A case, similar to the first of these, was seen by Dr. Gooch about 1829 in Guy's Hospital. The patient, a young woman, had been in the hospital some time before, for what was considered ovarian dropsy; but purgatives removed the tumour. A few months before I saw her, having a return of the enlargement, she consulted an enterprising surgeon, who assured her that she had a tumour in the ovary, which could be removed only by extirpation; for this purpose he made an incision in the linea alba six inches long, by which the cavity of the abdomen was exposed. It was then discovered, as in the case at Edinburgh, that there was no tumour, and that the enlargement depended on flatulence and fat; the wound was closed and healed; but the patient's health sustained great injury. (See Dr. Gooch's Account, &c., p. 222.)	Unknown.	No ovarian disease to be removed.	Recovered from the operation.

6	1826.	..	Incision nine inches and a half long; a large ovarian tumour brought to view, which had extensive adhesions, by firm bands, with the adjacent viscera and peritoneal coverings. (Medical Gazette, vol. i, 1842–3, p. 540.)	Dr. Granville.	Not removed.	Recovered from the operation.
7	1829, March 21.	30	Incision nine inches; a tumour, which weighed eight pounds, removed, and supposed to be ovarian. Dr. Lee examined this tumour in the recent state, and ascertained that it was a fibrous tumour, which had adhered to the fundus uteri by a thick peduncle; a portion of small intestine, which had come in contact with this root where incised, became inflamed and gangrenous. The preparation was several years after in the possession of J. North, Esq., but it has not been preserved.	Dr. Granville.	No ovarian disease to be removed.	Died from the operation.
8	1835.	..	November 1833, a tumour, discovered during the second labour, occupying the entire left half of the pelvis, pressed above the brim of the pelvis, and the labour natural. March 4, 1845, delivered again without assistance; left ovarium dropsical, which afterwards rapidly increased. Incision from ten to twelve lines in the course of the linea alba, between umbilicus and pubes; one cyst containing twelve pints, and another two ounces. The entire ovary extracted, and its connections divided; ends of ligature protruded; wound closed with two sutures, adhesive plaster, and lint. On the 10th, incessant vomiting, hiccough; pulse scarcely to be felt. These symptoms subsided. Secretion of milk. The patient recovered; and has since given birth to five healthy children, and is still alive.	W. Jeaffreson, Esq., Framlingham, Suffolk.	Removed.	Recovered from the operation and disease.
9	....	..	Abdomen distended during three years with solid and fluid matter; two gallons of fluid removed by tapping; operation repeated; the solid part of the mass was large, irregular, and presenting three spherical projections; elastic feel; the disease had made slow progress. An incision about three inches through the parietes, a little above a line drawn across the abdomen from the umbilicus; the fluid escaped, and a portion of omentum: the wound was closed. The tumour, after death, was found to be an enlarged gland, in a fold of the mesentery. (Lancet, vol. i, 1837, p. 586.)	H. C. King, Esq., Saxmundham, Suffolk.	Not removed.	Died a few months after.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
10	1834, March.	40	A tumour on the right side, between the superior spine of the ilium and the short ribs, four to five inches long and two or three broad; moveable; health not much deranged. A vertical incision through the parietes and linea semilunaris of seven or eight inches; search made for tumour without success; wound enlarged four inches, in direction of lumbar vertebræ; tumour not discovered; wound closed. Health improved after the operation. (Lancet, vol. i, 1837, p. 587.)	H. C. King, Esq., Saxmundham, Suffolk.	Not removed.	Recovered from the operation.
11	1836.	40	Hannah Cavell, Aug. 1833. Abdomen enlarging for three years; enlargement, with fluctuation, went on increasing; emaciation; an incision as in the last case; twenty-seven pints of gelatinous fluid removed; opening enlarged to three inches; a large thick cyst and solid tumour extracted; ligature slipped off; three ligatures reapplied; little hæmorrhage. The patient was in good health five months after, and twelve months since. (Ibid., p. 588.)	H. C. King, Esq., Saxmundham, Suffolk.	Removed.	Recovered from the operation.
12	1836, Nov. 2.	45	Mrs. Hurrion, of Southborough, mother of three children. Incision, two inches; sac punctured, and twenty pints of fluid drawn off; then drawn out, and its root tied and divided; no adhesions; doing well when the history of the case was published. Present, Dr. Scudamore and Mr. Hargraves. This patient is now alive and well. (See the Tables of Mr. B. Phillips and Mr. S. Lee.)	— West, Esq.	Removed.	Recovered from the operation.
13	. . . .	23	Miss S—. Small incision; no adhesions; twenty-four pints of fluid removed. (Ibid.)	— West, Esq.	Removed.	Recovered from the operation.
14	. . . .	40	Small incision; adhesions; cyst not removed. (Ibid.)	— West, Esq.	Not removed.	Recovered from the operation.
15	. . . .	24	Short incisions; cyst tapped before extraction; eleven gallons of fluid removed. (Ibid.)	— West, Esq.	Removed.	Died.
16	. . . .	..	The disease had existed more than twenty years; tapping twice. No details of the operation could be obtained. The lady recovered perfectly, and was then in good health. (Lancet, 1839–40, vol. i, p. 287.)	B. C. Crisp, Esq.	Removed.	Recovered from the operation.

17	. . . .	. .	"On discharging the fluid (about five pints of dark grumous matter), the sac was found to be very thickened and adherent, and complicated with tumour, about the size of a child's head at birth. The patient died in about five days; a *post-mortem* was not allowed." (Communicated by Mr. Hargraves, and never previously published.)	T. Hargraves, Esq.	Not removed.	Died.
18	. . . .	. .	"I was also present at an unsuccessful case at Riverhead, where the disease was complicated with tumour. The patient died in less than a week after the operation, although little more was done than the fluid let off, and a slight attempt made to break through the adhesions to the parietes." (Communicated by Mr. Hargraves, and likewise never previously published.)	. . . . .	Not removed.	Died.
19	1840.	21	Unmarried; in good general health. Incision two inches and a half; sac seized with the vulsella; 330 ounces of fluid evacuated; opening enlarged; cyst drawn out; root tied and excised, and sac removed without difficulty. Severe pain followed, with vomiting; and I saw the patient about half an hour afterwards with rapid feeble pulse; and cold extremities. I was present at the examination of the body, when the appearances of recent inflammation were observed within the pelvis, with a small quantity of extravasated blood. St. Marylebone Infirmary. (Med. Gazette, vol. xxvii, p. 83.)	B. Phillips, Esq.	Removed.	Died.
20	1843.	19	E. D—. Fifteen months before slight increase of abdomen. Perceived pain in right side, with fever; rapid increase; a large tumour occupying the abdomen; on the left side adhesions suspected where the mass was hard; fluctuation on right side. Incision at first four inches below umbilicus; incision extended upwards to the ensiform cartilage. No adhesions. (Guy's Hospital Reports, vol. i, p. 477.)	A. Key, Esq.	Removed.	Died.
21	1843.	32	Married, but never pregnant; cysts and solid tumour; adhesions with cancerous disease of the uterus; long incision; a portion of omentum included in ligature; peritonitis. This and the last case occurred in Guy's Hospital. (Med.-Chir. Trans., vol. xxvii, p. 76.)	B. Cooper, Esq.	Removed.	Died.
22	1843, Sept. 3.	29	Mary Nicholson, married. Good health till her marriage, more than two years before. Six months after a moveable tumour, the size of an orange in the pubic region, which rapidly enlarged; nine months after	T. M. Greenhow, Esq.	Removed.	Died in a few days.

No.	Date	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
			supposed to be in labour; abdomen enlarged, and strength failed; fluctuation in one or two places, but the tumour generally firm; incision from near the ensiform cartilage, to the pubes; several adhesions divided; root tied, and tumour excised. (Med.-Chir. Trans., vol. xxvii, p. 88.)			
23	1843, Nov. 19.	28	Miss —. Removed the entire cyst; no adhesions; had suppurations within the peritoneal cavity; recovered. Since married, has had one dead and one living child. Is now living. (The history of this and the following cases was communicated by Mr. Lane to Dr. Lee.)	S. Lane, Esq.	Removed.	Recovered.
24	1844, Feb. 15.	47	Mrs. L—. Removed a very large cyst; firm adhesions to the anterior wall of abdomen above the umbilicus, and from one hypogastric region to the other; none elsewhere. Recovered; died two years after of stricture of the rectum. (Ibid.)	S. Lane, Esq.	Removed.	Recovered. Died two years after.
25	1844, Feb. 15.	43	Mrs. —. Removed the cyst, with the exception of a portion attached to the side and fundus of the uterus; recovered; lost her husband three years after the operation. Married again in about a year; died about fifteen months after her last marriage. (Ibid.)	S. Lane, Esq.	Partially removed.	Recovered.
26	1844, Nov. 21.	20	Miss P—. Removed the cyst; no adhesions; recovered; now living. (Ibid.)	S. Lane, Esq.	Removed.	Recovered.
27	1845, Sept.	40	Mrs. W—. Removed the cyst; universal adhesions to the anterior wall of the abdomen, also posteriorly to the liver, kidney, renal capsule, and the cava inferior; left a small portion of the cyst adherent to the renal capsule and cava. Died of peritonitis on the third day from the operation. (Ibid.)	S. Lane, Esq.	Cyst partially removed.	Died in three days, from peritonitis.
28	1845.	39	Miss T—. Removed the cyst; no adhesions; had pelvic abscess; recovered; still living, but the discharge from the abscess has never ceased; and the movements of the hip-joint are much interfered with. (Ibid.)	S. Lane, Esq.	Removed.	Recovered partially.
29	1846, Nov.	31	Miss A—. Incision made; attempts made to remove the cyst not successful; recovered rapidly from the operation. Died two years afterwards from an attempt to produce suppuration of the adhering cyst. (Ibid.)	S. Lane, Esq.	Not removed.	Recovered from the operation.

30	1847, April 24.	40	Mrs. P—. Solid tumours and ascites; small explorative incision made; tumours not removed on account of their connections; well in two days from the operation; still living. (Ibid.)	S. Lane, Esq.	Tumour not removed.	Recovered from the operation.
31	. . . . .	. .	Large solid tumour of the size of the uterus at the full period of pregnancy. Incision from umbilicus to pubes; tumour too much connected with the uterus for removal; recovered from the operation; wound healed; able to walk about; died suddenly five weeks from the operation, after an attack of dyspnœa. The *post-mortem* examination discovered no cause of death, with the exception, perhaps, of pale flabby heart; no evidence of inflammation of the addominal cavity. (Ibid.)	S. Lane, Esq.	Tumour not removed.	Died in five weeks after.
32	1848, Oct. 15.	54	Miss D—. Incision made; universal adhesions prevented the removal of cysts; rapid recovery from the operation. Two years after, suppuration produced in three or four of the cysts. Now living in tolerable health. (Ibid.)	S. Lane, Esq.	Cysts not removed.	Recovered from the operation.
33	1849, Nov.	24	Miss H—. Inflammation of the cyst produced, followed by cure. (Ibid.)	S. Lane, Esq.	Not removed.	Recovered.
34	1839.	26	Small incision. Adhesions; tumour not extracted. Operated upon in Guy's Hospital by Mr. Morgan. Considered by all who saw the case most favorable for the operation. (See Mr. B. Phillips's Table, p. 474.)	— Morgan, Esq.	Not removed.	Died in forty-eight hours.
35	1842.	46	The tumour large and solid; pelvic cavity filled; fluctuation one, detected above the pubes; incision nearly from sternum to pubes. (The histories of this and the following cases were communicated by Dr. Clay.)	Dr. Clay.	Removed.	Recovered.
36	1842.	57	Nine children. Ascites; paracentesis; an ovarian tumour four pounds in the left iliac region, hard and heavy; parietes in front, below the umbilicus, attached to it. Incision ten inches; strong adhesions in every direction, overcome by the scalpel; a double ligature passed through the root; tumour removed; recovery rapid. (Ibid.)	Dr. Clay.	Removed.	Recovered.
37	1842.	47	Great enlargement, and fluctuation chiefly on the left side. Two years before tapped of two pints of bloody fluid; at first a small incision. The whole anterior surface of the mass adherent; tumour vascular; pierced in various parts when blood issued. The removal of the tumour impracticable. Died on the sixth day after the operation. (Ibid.)	Dr. Clay.	Not removed.	Died from the operation.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
38	1842.	39	Right side of abdomen enlarged four years before; tapped four times; a bold incision; sac exposed with numerous incisions; an immense sac removed; recovery rapid. Good health. (Ibid.)	Dr. Clay.	Removed.	Recovered.
39	1843.	35	Mrs. L—. Frequently tapped; extensive adhesions between the cyst and parietes; tumour eighteen pounds and a half; fluid seven pounds. (Ibid.)	Dr. Clay.	Removed.	Died.
40	1843.	40	Mrs. E—. Sterile; the tumour removed weighed thirty pounds; peritonitis in twelve hours; and she died at the close of the second day. (Ibid.)	Dr. Clay.	Removed.	Died.
41	1843.	46	Mrs. B—. Forty pounds of fluid drawn off by tapping; numerous small tumours felt; incision four inches; large quantity of fluid with hydatids escaped; most of abdominal viscera enlarged and adhering together, especially the uterus; right ovary and spleen; twelve folds of white worsted a foot in length introduced into the abdominal cavity; wound closed. Two years after in health.	Dr. Clay.	Not removed.	Recovered from the operation.
42	1843.	40	Mrs. P—. Ovarian disease of ten or twelve years' standing; repeatedly tapped; a large solid mass with the empty sac right side; incision ten inches; three adhesions; active inflammation followed, but was subdued.	Dr. Clay.	Removed.	Recovered.
43	1845.	38	Mrs. W—. Large ovarian tumour; frequent attacks of inflammation; incision four inches; extensive adhesions; cleared out sac; a string of threads left hanging out of it; discharge nearly gone in four months; size of abdomen nearly natural. In 1847 in good health.	Dr. Clay.	Not removed.	Recovered from the operation.
44	1846.	51	Mrs. S—. Abdomen, size of the gravid uterus at the full period; tapped; sac extirpated. Incision from umbilicus to pubes. No adhesions, no unfavorable symptoms followed.	Dr. Clay.	Removed.	Recovered.
45	1845.	35	Mrs. T—. Sterile; tapped thrice; solid part moveable; few adhesions. Length of incision not stated.	Dr. Clay.	Removed.	Recovered.
46	1845.	38	Two ovarian cysts; tapped; two solid masses remained, and adhesions in two places to the parietes. Length of incision not stated. Cysts and solid matter removed. Six months after was stouter than at any former period of life.	Dr. Clay.	Removed.	Recovered.

47	1843.	45	Mrs. H—. Tumour size of the gravid uterus at the eighth month, hard, unyielding, lobulated, moveable, not fluctuating. Incision thirteen inches. No adhesions; tumour exposed; has a broad attachment; the greater part of the uterus forming part of the tumour; great difficulty in securing the exposed vessels; attacks of syncope succeeded; and she died in an hour and a half. The tumour weighed twelve pounds, and included a portion of the os and cervix uteri.	Dr. Clay.	Removed, and also a part of the uterus.	Died soon.
48	1844.	52	Enormous enlargement of abdomen of sixteen years' duration. Incision twelve inches. Uterus enlarged to twenty pounds; left ovary four pounds. The whole extirpated, connecting the vagina into a *cul de sac*. Both ovaries and uterus extirpated. Died on the fifteenth day.	Dr. Clay.	Both ovaries and uterus removed.	Died.
49	1846.	26	A large ovarian cyst of three years' duration, with a small solid mass; first tapped, and then the cyst extirpated. Weight thirty-five pounds. No adhesions. Died on the tenth day.	Dr. Clay.	Removed.	Died.
50	1846.	32	One child, seven years before, began to enlarge in 1842; tapped five times. Incision thirteen inches. Recovered perfectly in less than five weeks, and is now perfectly well.	Dr. Clay.	Removed.	Recovered.
51	1848.	27	Ovarian disease of three years' duration; tapped. On opening abdomen a sac with few adhesions, exposed, except that near the attachment to the right ovary; a solid mass of five pounds, so firmly attached to the adjacent parts that its removal was improper. The sac and its contents removed. A thick tent passed into the substance of the solid mass; in five weeks, tent came away, and discharge ceased. No swelling now remains, and she has resumed her occupation.	Dr. Clay.	Partially removed.	Recovered.
52	1847.	32	Mrs. H—. Tapped; after in the right iliac region, a solid mass of four or five pounds, without adhesions; tapped. Operation easy; no adhesions. The sac and mass removed, fourteen pounds and a half. Became pregnant five months after; delivered of a dead fœtus. Is now in good health.	Dr. Clay.	Removed.	Recovered.
53	1846.	22	Ovarian disease on the right side for five or six years. A large sac tapped six times, the last time a few days before the operation. A broad patch of adhesions. Tumour weighed twenty-nine pounds.	Dr. Clay.	Removed.	Recovered.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
54	1846.	35	Tapped six times. Tumour of considerable size, without adhesions. Incision fourteen inches. On the fifteenth day after the operation returned home.	Dr. Clay.	Removed.	Recovered.
55	1846.	45	Mrs. A—. Ovarian disease twelve years. Large solid tumour. Incision from sternum to pubes. Adhesions. Peritonitis followed, but she recovered.	Dr. Clay.	Removed.	Recovered.
56	1847.	51	Mrs. J—. Emaciated; ovarian disease sixteen years. Tumour weighed forty pounds. Some adhesions. Died in thirty-six hours.	Dr. Clay.	Removed.	Died.
57	1848.	51	Mrs. L—. Long standing ovarian disease; tapping; a cyst with adhesions and a solid mass on the right side. Incision ten inches. Recovered, and was in good health in less than a month.	Dr. Clay.	....	Recovered.
58	1848.	47	Mrs. B—. Ovarian disease five or six years; tapped; sac adherent; exploratory incision. No further proceeding. An incision lower down. No adhesion detected; extirpation; exhaustion. Died on the sixth day.	Dr. Clay.	Not removed.	Died.
59	1848.	40	Mrs. B—. Tumour removed, forty-six pounds. Now in excellent health.	Dr. Clay.	Removed.	Recovered.
60	1848.	19	Miss M. K—, Edinburgh. Tumour removed. Died within twenty-four hours.	Dr. Clay.	Removed.	Died.
61	1848.	35	Mrs. T—. Tumour removed, which with cystic and ascetic fluid weighed fifty pounds.	Dr. Clay.	Removed.	Died.
62	1846.	27	Ellen D—. Tumour removed weighed forty-eight pounds. Now quite well.	Dr. Clay.	Removed.	Recovered.
63	1848.	45	Mrs. S—. Tumour removed, which weighed twenty-eight pounds. Now in good health.	Dr. Clay.	Removed.	Recovered.
64	1847.	25	Mrs. A—. Tumour removed, forty-pounds. Is now quite well.	Dr. Clay.	Removed.	Recovered.
65	1848.	18	Miss J—. Tumour removed, thirty pounds. Died in thirty-six hours.	Dr. Clay.	Removed.	Died.
66	1848.	47	Sarah J—. Tumour removed, thirty-seven pounds. Recovered. Now well.	Dr. Clay.	Removed.	Recovered.
67	1847.	27	Tumour removed, thirty pounds. Died on the ninth day.	Dr. Clay.	Removed.	Died.
68	1848.	35	Mrs. R—. Tumour removed, twenty pounds. Died on the third day.	Dr. Clay.	Removed.	Died.
69	1846.	37	Mrs. McA—. Tumour removed, forty pounds. Recovered very slowly, but is now well.	Dr. Clay.	Removed.	Recovered.
70	1849.	33	Mrs. W—. Weight of tumour, thirty-one pounds. Is now well, and has had a still-born child since.	Dr. Clay.	Removed.	Recovered.
71	1849.	32	Miss W—. Tumour thirty-five pounds. Now in good health.	Dr. Clay.	Removed.	Recovered.

72	1849.	48	Mrs. S—. Tumour seventy-six pounds. Now in good health.	Dr. Clay.	Removed.	Recovered.
73	1850.	45	Mrs. H—. Weight of tumour extirpated, twenty-four pounds. Now quite well.	Dr. Clay.	Removed.	Recovered.
74	1850.	38	Mrs. S—. Weight of tumour twenty-four pounds. Contents of sac two days previously, thirty-pounds. Now progressing favorably.	Dr. Clay.	Removed.	Recovered.
75	1844.	22	H. H—. Ovarian disease five or six years; tapped six times; tumour twenty-nine lbs. fourteen oz.; long incision.	Dr. Clay.	Not removed.	Recovered from the operation.
76	. . . . .	. .	Four cases of peritoneal sectional exploration from one inch and a half to two inches and a half.	Dr. Clay.	Not removed.	Recovered.
77	. . . . .	. .	Second case of peritoneal sectional exploration.	Dr. Clay.	Not removed.	Recovered.
78	. . . . .	. .	Third case of peritoneal sectional exploration.	Dr. Clay.	Not removed.	Recovered.
79	. . . . .	. .	Fourth case of peritoneal sectional exploration.	Dr. Clay.	Not removed.	Recovered.
80	. . . . .	. .	Fifth case of peritoneal sectional exploration.	Dr. Clay.	Not removed.	Died.
81	1843, Oct. 20.	37	Mrs. H—, mother of six children. After a protracted labour two years and a half before, followed by inflammation, a small tumour felt above and to the left side of the pubis; abdomen afterwards increased with pain; a circumscribed moveable tumour before the operation above the pubis, the size of the fœtal head; uterus healthy; an incision through the skin from the right of the umbilicus along the mesial line to within three inches of symphysis pubis; peritoneum exposed and punctured; four quarts of ascetic fluid escaped; wound enlarged to the extent of nine inches; omentum adhering to tumour, separated; pedicle of tumour tied and removed; tympanites and obstinate vomiting, which caused the ends of the ligatures to be drawn within the abdominal cavity. After several weeks a small abscess at the lower part of the cicatrix. In 1845 the patient was in perfect health. (Medical Gazette, 1843.)	G. Southam, Esq.	Removed.	Recovered.
82	1845, June 24.	38	Mrs. S—, married twenty years. Sterile; enlargement observed eight years before; abdomen before the operation greatly enlarged; fluctuation of a resisting kind; exploratory incision; no adhesions; cyst punctured; sixteen pints of fluid evacuated; opening enlarged above and below to six or seven inches; cyst drawn out; root tied and divided; the ligature came away on the forty-ninth day, and the patient is now in the enjoyment of perfect health. (Provincial Med. and Surg. Association, 1845.)	G. Southam, Esq.	Removed.	Recovered.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
83	1847, May 21.	26	Mary H—. Five children; after her last confinement became dropsical and was tapped; recently the tumour had increased rapidly with pain; an incision first made three inches long; six pounds of ascetic fluid escaped; no adhesions; unsuccessful attempt to tap the tumour; incision extended; adhesions; tumour removed; faintness; dyspnœa took place on the 23d, and she died on the 26th. (Provincial Med. and Surg. Journal, vol. iii, new series, 1847.)	G. Southam, Esq.	Removed.	Died.
84	. . . .	. .	"In another case I made an exploratory incision," says Mr. Southam, "with a view of determining on the propriety of extirpation, or adopting the operation recommended by Mr. Bainbrigge of Liverpool, having previously satisfied myself that adhesions existed, which I thought, if they proved too extensive in extirpation, might facilitate the other operation. The patient recovered from the exploratory incision without a bad symptom, but died from the effect of Mr. Bainbrigge's operation, suppuration of the cyst having produced violent irritative fever. The tumour was multilocular, consequently a very favorable one for Mr. Bainbrigge's plan." (This case is not published.)	G. Southam, Esq.	Not removed.	Died.
85	1846,	20	Unmarried; tumour first perceived eighteen months before; tapping six times, large incision; both ovaria diseased and removed; fatal peritonitis and phlebitis followed. (Ed. Med. & Surg. Journ., vol. lxv, pp. 278—308.)	Dr. Handyside.	Both ovaria removed.	Died.
86	1846, Sept. 3.	38	Mrs. P—, married, and five children. Seen first by Dr. Handyside, Oct. 1845, eleven months subsequent to the birth of her last child; a moveable tumour of the left ovary, with a large dropsical swelling. Feb. 1846, tumour and dropsical swelling increased; tapping; the tapping repeated thrice. Sept. 3, "Incision four inches; a similar procedure adopted to that in the last case, with the exception of the line of exit for the ligature being through the recto-vaginal cul-de-sac of peritoneum." "The two ligatures were carried out per vaginam." The tumour, consisting chiefly of cysts, weighed ten pounds. (Dr. Handyside has communicated the history of this and the following case.)	Dr. Handyside.	Both ovaria removed.	Died of peritonitis.

87	. . . . .	. .	"Dr. Simpson communicated verbally to the Edinburgh Medical and Chirurgical Society, in December 1849, a notice of a fatal case of ovariotomy that occurred to himself. So far as I know, this is the only instance in which he has operated." (Unpublished.)	. . . . .	. . . . .	Died.
88	1848.	23	An incision first made of one inch, the finger introduced, and no adhesion felt; opening extended to three inches; the sac tapped; a second cyst detected and tapped, both cysts firmly adhering. Operation could not be completed. (Middlesex Hospital—Pathological Transactions.)	J. M. Arnott, Esq.	Not removed.	Died.
89	1849.	24	F. W—. Abdomen first perceived to be swollen in 1847; tapped in operation July 9, 1849; incision twelve inches; compound cyst and solid tumour; one adhesion; pedicle thick as a middle-sized finger. August 15, wound healed. (Med. Gazette, vol. xliv, p. 366.)	J. Crouch, Esq.	Removed.	Recovered.
90	1843.	40	Long incision; fibrous tumour of uterus removed; hæmorrhage. (See S. Lee's Table, p. 268.)	A. M. Heath, Esq.	Removed.	Died.
91	. . . .	. .	Incision; cyst removed; recovered. (Ibid.)	M. Morris, Esq. Rochdale.	Removed.	Recovered.
92	1846.	24	This patient, seen first by Mr. Arrowsmith, April 1846, had been tapped once for ovarian dropsy. The case in all respects appeared favorable for the operation. An incision six inches; adhesions so strong in every direction, that the farther steps of the operation were abandoned: no bad symptoms followed. Some weeks after was tapped. The further history of the case unknown. (Communicated by Mr. Arrowsmith to Dr. Lee, June 4, 1851.)	J. Y. Arrowsmith, Esq.	Not removed.	Recovered from the operation.
93	1846.	18	St. George's Hospital. A single cyst without adhesions; incision three inches. (Med. Gazette, vol. iii, New Series, p. 735.)	C. Hawkins, Esq.	Removed.	Recovered.
94	1846.	20	Incision four inches; no adhesions; one cyst, right side; hæmorrhage from slipping of the ligature; left ovarium diseased. (Med. Gazette.)	S. Solly, Esq.	. . . . .	Died.
95	1846.	39	Large incision; no adhesions; multilocular cyst, complicated with chronic peritonitis; tumour weighed twenty pounds, fluid ten pounds. Died in four hours from shock of operation. (See S. Lee's Treatise, p. 271.)	Dr. P. Smith.	Removed.	Died.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
96	1845.	18	Unmarried; duration of disease eighteen months; incision fourteen inches; adhesions; two pints of fluid drawn off; the two hands introduced on each side of the tumour deep into the pelvis, and tumour raised; a double ligature passed through the ligature and divided. (Prov. Med. and Surgical Journal, 1845, p. 597.)	J. Dickens, Esq.	Removed.	Recovered.
97	1846.	25	Married six years; three children; enlargement first observed seven years before; small incision first made; no adhesions; the incision extended up to within one inch and a half of the ensiform cartilage and downwards to the pubes; cyst tapped and drawn out; uterus six months gravid; cysts and solid matter removed; afterwards became pregnant and had a healthy child. (Medico-Chirurgical Transactions, Vol. XXX, p. 95.)	H. E. Burd, Esq.	Removed.	Recovered.
98	1850.	38	Compound cysts of seven or eight months' duration; incision under three inches; some difficulty in extracting the large cyst; tapped and difficulty overcome; pedicle tied and divided. (Ibid., Vol. XXXIV, pp. 1—3.)	E. Duffin, Esq.	Removed.	Recovered.
99	1850, Feb. 19.	19	Sept. 1848, a tumour the size of an orange on the right side of the hypogastrium first perceived, which gradually increased in size. In Jan. 1850, the abdomen as large as at the full period of gestation; fluctuation distinct; incision ten inches; two slight adhesions between the omentum and anterior surface of tumour; cyst emptied; root tied and divided; one large and several small cysts removed; the patient in good health eight months after. (Lancet, vol. ii, 1850, p. 680.)	C. H. Cornish, Esq.	Removed.	Recovered.
100	1850, March 7.	33	Sept. 17th, 1844; tapped. Treatment by pressure twelve months. Married, and safely delivered within a year. Tapped 1846 and 1850; an exploratory incision made; a slight recent adhesion. Incision extended to twelve inches. An enormous triple headed cyst removed. Died on the third day from peritonitis. (History communicated by Dr. Ely and Mr. Isaac Brown to Dr. Lee, and not previously published.)	I. Brown, Esq.	Removed.	Died.

101	1850.	24	Married nine months in Feb. 1850. Speedy pregnancy; abdomen large; labour natural; abdomen continued large; constitutional disturbance; jaundice. Ten days after delivery abdomen forty-eight inches and a half in circumference. Eleven weeks after delivery seven gallons of dirty brownish fluid, with flakes of lymph and pus, drawn off; no bad symptoms followed, but twenty-five days after abdomen measured fifty inches. Operation then performed; incision three inches a little to the left side; finger passed between two closely adherent layers, which were the parietal peritoneum and the sac closely adherent. Mr. Phillips seized the exposed sac with double hooks, but it rent, and the contents escaped, which were five gallons of pure pus; edges of sac fastened to wound of abdominal walls. Died ninety-six hours after the operation. After death, cyst found universally adherent. (History communicated by Dr. West and Mr. Paget to Dr. Lee, and never previously published.)	J. Paget, Esq.	Not removed.	Died.
102	1848, Sept. 2.	34	Susan C—, married nine years; one child. Ovarian disease two years and a half's duration; tapped twice; emaciated and debilitated; dyspnœa. Incision from ten to twelve inches; extensive adhesions. The attempt at its removal abandoned; eight days after wound nearly closed. Cyst fast filling. Six days after, during a fit of coughing and vomiting, wound burst asunder and many pints of fluid escaped, and the flow continued till she died on the 23d, three weeks after the operation. A second cyst. The other ovarium had a single cyst attached, from which three pints of fluid escaped. (Communicated by Mr. Anderson to Dr. Lee, and never previously published.)	A. Anderson, Esq.	Not removed.	Died.
103	1849, Oct. 29.	25	Unmarried. At the age of 22, tumour appeared in right iliac region; increased rapidly during last six months, but its development unattended with pain. Universal fluctuation. Measured forty-one inches in circumference. Cyst presumed to be single and not adherent. Operation by small incision resolved on. Cyst found to be of remarkable tenuity, containing transparent fluid. Contrary to expectations universal adhesions to peritoneum and compound cysts. In fourteen days the abdomen as large as before. (Communicated by Dr. West to Dr. Lee, and never before published.)	C. De Morgan, Esq.	Not removed.	Recovered from the operation.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
104	1845.	33	Incision four inches; no adhesions; cysts tapped and extracted. (See S. Lee's Table, p. 270.)	W. B. Page, Esq.	Removed.	Recovered.
105	....	..	Long incision; adhesions. (Mr. Phillips's Table.)	A. B.	Not removed.	Died.
106	....	..	Small incision; adhesions. (Ibid.)	C. D.	No tumour.	Recovered.
107	....	..	Large incision; adhesions. (Ibid.)	E. F.	.....	Died.
108	....	..	Long incision; extensive and strong adhesions which were violently torn up. A personal friend who was present at the operation communicated all the details to Dr. Lee. Death speedily followed. (Unpublished.)	Mr. Walne.	Removed.	Died.

FIFTY-FOUR SUPPLEMENTARY CASES.

109	....	58	Large incision; no adhesions; tumour sixteen pounds, nearly all fluid. (Mr. B. Phillips's Table, Med.-Chir. Trans., Vol. XXVII, p. 474.)	Mr. Walne.	Removed.	Recovered.
110	....	57	Large incision; no adhesions; tumour sixteen pounds and three-quarters. (Ibid.)	Mr. Walne.	Removed.	Recovered.
111	....	20	Large incision; no adhesions; tumour twenty-eight pounds. (Ibid.)	Mr. Walne.	Removed.	Recovered.
112	....	54	Large incision; adhesions; not extracted. (Ibid.)	Mr. Walne.	Not removed.	Recovered from the operation.
113	....	45	Large incision; no adhesions; tumour twenty-four pounds. (Ibid.)	Mr. Walne.	Removed.	Died.

114	1844, April 22.	30	Miss D—. Abdomen enlarged from ovarian disease, January 1841. In January 1844, consulted Mr. Walne, who proposed the operation for removal. Operation for removal commenced by Mr. Walne making an incision of one inch midway between umbilicus and pubes in linea alba, down to peritoneum. Dr. Blundell inserted a silver probe its full length into the cavity of the abdomen without ascertaining the position of the solid tumour. Operation proceeded with: incision extended to about three inches in length, and fluid contents of sac burst forth; about twenty-four pints of fluid ran off, leaving the integuments flaccid, and the size entirely reduced; further progress of operation stopped; patient placed in bed, when for nearly a week she suffered much from fever and cerebral disturbance. The patient recovered, but abdomen became again full. In 1846 married; in 1847 bore a still-born child; in 1849 bore a healthy child, which with herself continue well up to the present time. October 31st, 1850, Mr. Walne, Dr. Blundell, Mr. Vincent, and Dr. Hogg, were present on the occasion. Dr. Hogg has communicated to me the above details of this case, which have not hitherto been published. Mr. Walne having declined to communicate to Dr. Lee the entire results of his operations, successful and unsuccessful, after repeated solicitations to do so; it is impossible, therefore, to state these results, as they have not yet been published. Dr. F. Bird likewise declined communicating the desired information, but has since published the following imperfect details.	Mr. Walne.	Not removed.	Recovered from the operation.
115	. . . .	. .	Mrs. G—. Large, non-adherent tumour. (Lancet, vol. ii, 1850, p. 592.)	Dr. F. Bird.	Removed.	Recovered.
116	. . . .	. .	Miss H—. Large, non-adherent tumour; sessile. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
117	. . . .	. .	Mrs. W—. Large, colloid tumour, generally adherent. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
118	. . . .	. .	Miss M—. Large simple sac. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
119	. . . .	. .	Tumour adherent to pelvis and uterus, rendering necessary to leave a segment of the cyst attached. (Ibid.)	Dr. F. Bird.	Removed partially.	Recovered.
120	. . . .	. .	H. T—. Tumour adherent to pelvis, of great thickness. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
121	. . . .	. .	Miss M—. Large sessile tumour; adhesions. (Ibid.)	Dr. F. Bird.	Removed.	Died.
122	. . . .	. .	Mrs. L—. Tumour bound down in pelvis, causing unceasing suffering; tapping required every ten or twelve days. (Ibid.)	Dr. F. Bird.	Removed.	Died.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
123	. . . .	. .	Mrs. H—. Two large compound tumours, involving both ovaries. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
124	. . . .	. .	Mrs. G—. Small tumour, non-adherent. (Ibid.)	Dr. F. Bird.	Removed.	Died.
125	. . . .	. .	Large compound tumour. (Ibid.)	Dr. F. Bird.	Removed.	Died.
126	. . . .	. .	Miss K—. Large, and slightly adherent tumour. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
127	. . . .	. .	Large tumour, with very short pedicle. (Ibid.)	Dr. F. Bird.	Removed.	Recovered.
128	1848, Jan. 6th.	30	Mrs. P—. Very large malignant mass; inseparably adherent posteriorly; extreme suffering from distension by solid matter, and rapidly approaching death, rendered the attempted operation justifiable. (Ibid.) The following details of this case have been communicated to Dr. Lee by Dr. Hogg:— Mrs. P—. Married in 1841; never pregnant. January 1844, first perceived enlargement of the abdomen. In 1846 had strong pressure applied to the abdomen, after being tapped by Mr. J. Brown. A second tapping; the operation of ovariotomy undertaken by Dr. F. Bird, 6th January, 1848, present Dr. Rigby, Mr. Holt, two assistants, and Dr. Hogg, who has communicated these details to Dr. Lee. "An incision of two inches was made in the linea alba, midway between the umbilicus and pubes, and twenty pints of liquid were drawn off by a large canula; the opening was then fairly made into the cavity of the abdomen, and the solid tumour seized by forceps; the size, however, of the tumour was such that the opening was of necessity extended to ten inches before it could be drawn forth; tumour then found adhering strongly behind the small intestines, and, in fact, to all the abdominal viscera. Dr. F. Bird attempted to separate it from them, by conveying his hand behind it, and, to a certain extent, succeeded in so doing; but on the tumour advancing through the opening, it brought the colon with it, rather before it, which was so firmly adhering that it defied all attempts at separation, even with the handle of the scalpel; the removal being impossible, it was replaced in the abdomen, and the external opening sewed up. The operation occupied an hour and ten minutes, during the whole	Dr. F. Bird.	Not removed.	Died.

		of which time she was kept under the influence of chloroform. The unfortunate patient on recovering herself from the effects of the chloroform, stated that she had heard all that was said, but suffered very little. She expired twenty-eight hours after." (Unpublished.)			
129	. . . . .	Mrs. P—. Small incision; then tapped. (Ibid.)	Dr. F. Bird.	Not removed.	Is now living.
130	. . . . .	Small incision; then tapped. (Ibid.)	Dr. F. Bird.	Not removed.	Is now living.
131	. . . . .	Miss —. Incision of rather large size. (Ibid.)	Dr. F. Bird.	Not removed.	Lived two years.
132	. . . . .	Mrs. C—. Small incision to ascertain character of adhesions, and of small tumour attached to the cyst, as well as to evacuate contents.	Dr. F. Bird.	Not removed.	Lived six weeks.
133	. . . . .	Miss G—. Incision. (Ibid.)	Dr. F. Bird.	Not removed.	Lived more than two years.
134	. . . . .	Mrs. B—. Incision; then tapped. (Ibid.)	Dr. F. Bird.	Not removed.	Lived nearly three years.
135	. . . . .	Miss B—. Incision; then tapped. (Ibid.)	Dr. F. Bird.	Not removed.	Lived six months.
136	. . . . .	Miss B—. Incision; then tapped. (Ibid.)	Dr. F. Bird.	Not removed.	Is now living.
137	. . . . .	A. B—. Incision; then tapped; tapped several times afterwards. (Ibid.)	Dr. F. Bird.	Not removed.	Not stated.
138	. . . . .	Incision; then tapped; tapped afterwards. (Ibid.)	Dr. F. Bird.	Not removed.	Unknown.
139	. . . . .	Mrs. S—. Incision; then tapped; tapped many times afterwards. (Ibid.)	Dr. F. Bird.	Not removed.	Unknown.
140	. . . . .	Mrs. C—. Incision; not tapped; afterwards tapped and died. (Ibid.)	Dr. F. Bird.	Not removed.	Recovered from the operation.
141	. . . . .	Miss G—. Incision to ascertain adhesions, and to remove any viscid contents. Died next day from bursting of a large hepatic abscess. (Ibid.)	Dr. F. Bird.	Not removed.	Died next day.
142	. . . . .	Mrs. C—. Small incision; then tapped; subsequently tapped; and was living more than a year afterwards.	Dr. F. Bird.	Not removed.	Recovered from the operation.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
143	. . . .	. .	S. B—. Incision; colloid. Was living after the lapse of ten months. (Ibid.)	Dr. F. Bird.	Not removed.	Recovered from the operation.
144	. . . .	. .	Mrs. W—. Small incision; then tapped; tapped many times afterwards. (Ibid.)	Dr. F. Bird.	Not removed.	Recovered from the operation.
145	. . . .	. .	L. —. Small incision; then tapped. Now living.	Dr. F. Bird.	Not removed.	Recovered from the operation.
146	. . .	. .	"We have had three other operations in this town by other surgeons, all of which were fatal, and I am acquainted with another which occurred at ———, which was also fatal.—None of these have been published." (The above statement was made confidentially to Dr. Lee by an eminent surgeon, well known to all the Fellows of the Society.) First case here referred to, unpublished.	. . . .	. . . .	Died.
147	. . . .	. .	Second of these fatal cases, unpublished.	. . . . .	. . . . .	Died.
148	. . . .	. .	Third of these fatal cases, unpublished.	. . . . .	. . . . .	Died.
149	. . . .	. .	Fourth of these fatal cases above referred to, unpublished.	. . . . .	. . . . .	Died.
150	Oct., 1850.	35	"Miss B—, Yorkshire. Single female. Tumour removed with great facility, about twenty-seven pounds weight. Lived till the 9th day. Cause of death, inflammation and subsequent obstruction of bowels." (This and the following four cases have been communicated by Dr. Clay to Dr. Lee.)	Dr. Clay.	Removed.	Died.
151	1850, Nov.	33	Mrs. P—, 9, Manchester. Tumour, ten pounds. Now well; 1851.	Dr. Clay.	Removed.	Recovered.
152	1850, Nov.	57	Mrs. P—, Glasgow, now Manchester. Tumour, twenty-six pounds. Now quite well—well in 1851.	Dr. Clay.	Removed.	Recovered.
153	1850, Oct.	32	Mrs. H—. Sterile. Married some years; tumour small, removed. Now well 1851.	Dr. Clay.	Removed.	Recovered.

154	1851, Feb.	45	Mrs. C—, near Lyme, Regis. Tumour removed; about twenty-five pounds; had been tapped ten times; was greatly exhausted previously (only fourteen days interval between tapping). Died second day.	. . . .	. . . .	Died.
155	1850, 8 Nov.	23	Elizabeth North. In May, 1850, enlargement of the right side of the abdomen. Tumour the size of an orange. In September it was as large as the head of a child; no fluctuation; an incision five inches in length, commencing an inch above the umbilicus; instead of any part of the tumour appearing, several convolutions of the small intestines protruded, these, with some little delay, were returned; anterior parietes of the abdomen adhered very considerably and firmly to the tumour on each side of the incision; adhesions below also considerable, and appeared insurmountable; a portion of small intestine, fully two inches in length, adhered to the anterior part of the tumour; operation abandoned. (Provincial Med. and Surg. Journal, No. 1, 1851, p. 5.)	Geo. Norman, Esq.	Not removed.	Recovered from the operation.
156	1850, Nov. 14.	20	Hannah Hiscox. A tumour first perceived in the right iliac region in 1848. General health good; tumour moveable; fluctuation; incision from the umbilicus to about an inch and a half above the pubes; sac emptied, and root tied. Died three days after. (Prov. Med. and Surg. Journal, No. 11, 1851, p. 37.)	F. G. Stockwell, Esq.	Removed.	Died.
157	1850, 4 Dec.	30	Eliza Smith, unmarried. Enlargement commenced December, 1849; a circumscribed ovarian tumour, extending from the left iliac region to the left hypochondriac; fluctuating; uterus healthy; an incision of four inches between the umbilicus, and one inch and a half of the symphysis pubis; adhesive bands on both sides of the incision, separated; incision enlarged six inches upward; multilocular cysts; tumour removed (weight twenty-five pounds) and pedicle tied. January 11th, went to church. Walls of the cysts composed—1. Of a peritoneal layer. 2. A middle or fibrous layer of unequal density. 3. A thick membranous sac containing fluid. The middle coat at the root thick, and arteries, veins, and nerves ramifying upon it. The inner coat, in some of the smaller cysts, consisted of two layers; the cysts placed one within another, like a nest of boxes. (Prov. Med. and Surg. Journal, No. xv, 1851, p. 397. Read to the Medical and Chirurgical Society, June 24, 1851.)	J. Beales, Esq., Halesworth.	Removed.	Recovered.

No.	Date.	Age.	History of the Symptoms and Treatment.	Operator.	Ovarian disease removed or not.	Result.
158	1846, July.	37	Mary Boyce, mother of two children. In 1843 a tumour the size of a hen's egg, in the right iliac region, which increased till it was as large as the gravid uterus; tapped twice; a small incision first made; no adhesions; incision enlarged to five or six inches; adhesions then detected between fundus uteri and bladder. These adhesions were considered of such aserious character, as to preclude the possibility of completing the operation. (Provin. Med. and Surg. Journal, Aug. 6th, 1851.)	Dr. Elkington.	Not removed.	Died on the fourth day, from peritonitis.
159	1848, July 18.	46	Mrs. L—, five children. In 1830 first perceived a tumour in the right iliac region; stationary five years; two children after its appearance; in 1838, after an illness, size of tumour diminished, and remained so for six years,—it then increased; length of incision not stated. "The tumour was connected, by extensive adhesions, to the parietes at the fore and lower part of the abdomen, and to the edge of the omentum;" it was very vascular, and supplied by several vessels, which passed from the lower edge of the omentum to the surface of the tumour. (Prov. Med. and Surg. Journal, Aug. 6, 1851.)	Dr. Elkington.	Removed.	Died thirty-six hours after the operation.
160	1849, April 3.	31	Mrs. Moore, married fifteen months. Soon after began to enlarge on the left side; supposed to be pregnant; tumour very moveable; irregular and nodulated, indistinct fluctuation; tapped Feb. 28. "The tumour was so very large that, although the incision was extended to ten or twelve inches, we were obliged to empty one or two of the cysts before we could remove the tumour." No adhesions; recovered rapidly. April, 1851, safely confined. (Ibid.)	Dr. Elkington.	Removed.	Recovered.
161	1850, Sept. 26.	42	Mrs. Howard. Married twenty-one years; nine children; two years and a half since an enlargement in the left hypochondrium; six months after a hard moveable tumour; became pregnant, and was safely delivered; Aug. 30, tapped. Mr. Day "first drew off five gallons of ascitic fluid with the trocar, then passed a director through the opening made by the trocar, and laid open the abdominal cavity to the extent of five inches; and having ascertained that the tumour was free from adhe-	Mr. Day, of Walsall.	Removed.	Recovered.

			sions, he continued the incision upwards, making use of his fingers instead of a director, to within a short distance of the ensiform cartilage; he also extended the incision below nearly to the pubis." Pedicle, three inches wide, tied and divided; recovery slow and, for some time, doubtful; diarrhœa; sickness; aphthous condition of the mouth and fauces. (Ibid.)			
162	1851, May 7.	18	Rachael U—. Enlargement of abdomen at the age of 12 years and 3 months, which slowly increased; abdomen measuring forty-two inches and a half; swelling uniform; os uteri small, and high in the pelvis. "A small elastic swelling between uterus and bladder, a process of the cyst in the abdomen." Insensible from chloroform; incision two inches below the umbilicus; cyst attached, by thready cellular connections, to the abdominal walls; punctured, and seven gallons of brownish bloody fluid discharged; sickness; cyst propelled between the edges of the wound, it being thought that the attachments of the cyst were of a loose and lacerable kind, the opening was enlarged upwards, and the sac separated from the abdominal walls, lumbar regions, iliac fossæ, rectum and bladder; pedicle tied and divided; hæmorrhage from an artery which was tied; four or five other vessels tied. The patient pallid and faint from loss of blood, feeble efforts to set up reaction, which never came on, fell into a state of collapse, and died twenty-six hours after the operation. (Communicated by Mr. Baker to the President of the Society, and through him to Dr. Lee.)	Alfred Baker, Esq.	Removed.	Died twenty-six hours after the operation.

A CASE OF

SOFTENING OF THE SPINAL MARROW

IN A BOY AFFECTED WITH CHOREA.

BY

ROBERT NAIRNE, M.D.

PHYSICIAN TO, AND LECTURER ON MEDICINE AT, ST. GEORGE'S HOSPITAL.

Received November 13th.—Read November 26th, 1850.

As all facts which relate to disease in the Spinal Marrow may prove important in the elucidation of its physiology, I have thought that the history of the following case, and an account of the appearances found after death, might interest this Society.

George Strange, æt. 17, a greengrocer's boy, was admitted into St. George's Hospital on the 27th of June last. When I approached the sofa, on which he lay in the waiting room, and asked him to put out his tongue, I observed that he thrust it out in the same manner as a person with chorea. He had also the convulsive movements and distortion of features of chorea. His articulation was imperfect, but he had sufficient command over it to speak to me. He told me that he had pain in his back and knees and feet. He was unable to walk or even to stand. When he had been placed in bed I found that there was redness on his knees and ankles, as in rheumatism. His tongue was loaded, his skin was hot, and his pulse 108. On listening over the region of the heart I ascertained that there was a mitral systolic murmur.

His relations informed me that he had suffered from

rheumatism several times since the age of twelve, and that the last attack was about Christmas; but that this was the first time they had seen him "in this way." From Mr. James George of Kensington, under whose care he had been previous to his admission into the hospital, I afterwards learnt, that, "for the last five weeks the friends had observed an unsteady, jerking action in his hands, which prevented him from placing things quietly in their places. The last two weeks he stuttered much, and frequently contorted his mouth. On the 18th he complained of rheumatism; but felt better on the 22d, and went to market in a cart. On his return he complained of having had an unusual jolting. Up to this time he had been able to walk; but on the next day he kept his bed, and did not attempt to walk afterwards. The rheumatism, and chorea more especially, increased from this day. He was said to have had a fit on the morning of the 24th."

I treated him under the impression that he was suffering from an acute attack of rheumatism, which had brought on chorea. The following day he seemed better, his articulation was more perfect, and the convulsive movements less frequent. On the 29th, however, he was worse, redness appeared on his knuckles, and was no longer to be seen on his knees and feet. He had not slept since he had been in the house. On the 30th he became more restless, was delirious during the night, and on the 1st of July was evidently much worse. His features were more distorted, the pulse was weaker. The convulsive movements were more frequent, and so violent that the sides of his legs and body had become excoriated. During the last two days of his life he passed his motions under him. He died a little after midnight of the 3d, the convulsive movements having ceased some hours before his death, and as a state of coma came on.

The body was examined twelve hours after death. The contents of the spinal canal were first looked at. The spinal veins were distended with blood. A portion of the spinal marrow, an inch at least in length, and situated opposite the third and fourth dorsal vertebræ, was white, and so soft that

the slightest pressure of the finger broke it up. It was almost in a fluid state.[1] The whole thickness of this portion was in this state. In consistence, firmness, and colour, all the rest of the cord was strongly in contrast with this part. Within the cranium the sinuses of the dura mater and meningeal vessels were gorged with blood, and so also were the large veins distributed over the surface of the brain. The substance of the brain was firm throughout. Its cortical structure was darker than usual, and bloody puncta were very numerous in the medullary substance.

The pericardium was found adhering entirely to the heart. The left ventricle of the heart was firmly contracted; the other cavities contained very small coagula. On the auricular surface of the mitral valve, numerous minute small rounded excrescences presented themselves, giving a fringed appearance to the valve; the other valves were healthy. Both lungs were loaded with blood, and there were patches of extravasated blood in their most depending parts. There was nothing unusual observed in the cavity of the abdomen.

This case is an additional instance of the frequent occurrence of chorea in rheumatism or in those of a rheumatic diathesis, to which attention has been of late years directed. But in Strange there was also palsy of the lower limbs. When he was admitted into the hospital, the inability to walk and the pain in the back I considered to be owing to rheumatism; but no doubt these symptoms were connected with the disease of the spinal marrow, the existence of which was revealed after death.

There are four instances recorded of softening of the spinal marrow in persons previously affected with chorea. Ollivier d'Angers quotes one as related by Brera, and two as having occurred to Guersent; but, he adds, "j'ai eu l'occasion d'ouvrir sous ses yeux le rachis d'un enfant qui était également affecté

[1] In the central part of this softened portion of the spinal marrow there was fluid, and the remainder was so thoroughly disorganised that it was thought unnecessary to put any of it under the microscope.

de chorée, chez lequel la moelle épinière n'offrit aucune altération sensible : sa consistance, sa couleur, et celle de ses membranes étaient dans l'état naturel ; *c'est ce qu'on observe le plus souvent.*"[1] The fourth case is recorded by Dr. Keir, of Moscow.[2] The history of the boy's symptoms, who had had chorea for three years, and the report of his state seven days only previous to his death, "walks about daily for some time without assistance," is a proof that the softening could not have been in the relation to this disease of cause and effect. I would observe, moreover, that the result generally noticed of organic alteration of nervous structure is palsy, and not spasm.

When we examine the facts which morbid anatomy has accumulated, we find that there is no condition of diseased structure which has been constantly discovered in chorea. Nor do I think that what has been observed in the brain and spinal cord, in such cases, affords any proof that chorea originates in either one or the other. In support of this conclusion I will add the result of what I have observed in the practice of St. George's Hospital. Besides Strange, I have seen three other patients with chorea who have died there. In all, a careful examination was made of the contents within the cranium and spinal canal. One was under my own care, and two were patients of Dr. Macleod. In all, there was congestion of the vessels of the brain. In my own patient there was congestion of the vertebral veins and of the substance of the spinal cord. In the first one, which occurred in the practice of Dr. Macleod, the posterior veins of the spinal cord were rather more than usually distended with blood, but there was no alteration in the appearance of the spinal marrow itself. It was also found perfectly healthy in the second case, though the veins of the cord were much congested. But the state of congestion in the vessels of the brain and spinal marrow, which was observed in these three cases, is of very frequent occurrence where the convulsions

[1] Traité de la Moelle Epinière, 2me ed., tom. ii, p. 817.

[2] Edin. Medical and Surgical Journal, vol. xliii, p. 93.

of chorea have not been exhibited. They are seen, for example, very generally in the bodies of persons who have died in various forms of fevers. Enough, I think, has been adduced to show that the pathology of chorea is not to be explained by the morbid anatomy of the brain or spinal marrow. Clinical observations of the disease and study of its symptoms, of the various causes in which it originates, and of its wonderful mental phases, will give us a truer insight into its nature. Contemplating it under all the circumstances with which it is connected, I am inclined to agree with my colleague, Dr. Wilson, that "chorea is more than merely nervous," that it is a disorder of the entire system, and does not proceed specially from the nerve, though expressed principally by the muscle."[1]

The softening of the spinal marrow, in this case, cannot, I conceive, be considered otherwise than as an accidental occurrence viewed in relation to chorea. Here arises, however, an interesting inquiry. It will be remembered that palsy ensued in the lower limbs of George Strange, but that he felt pain in them. Moreover, as often as any one approached Strange's bed, and still more manifestly when a question was put to him, the convulsive movements of the voluntary muscles were increased, not only in the face and upper part of the body, but even more violently in the lower limbs, and below that portion of the spinal marrow in which disease was going on to complete disintegration. The structure of a considerable portion of the spinal cord appeared to be altogether destroyed through its entire thickness, and, according to the usual teaching in physiology, incapable of the office of conducting nervous impressions. Yet the voluntary muscles of the palsied half of the body were excited to increased convulsive action by the influence of emotion.

We are taught that there should be a perfect state of the spinal cord, in order that an impression may be conveyed from the brain to the spinal nerves. We are also told that

[1] On Spasm, Languor, and Palsy, p. 101.

the seat of emotion is in the mesocephale. If these be true propositions, I would ask through what channel were the impressions conveyed to the voluntary muscles in Strange's palsied lower limbs, when they were thrown into convulsive movements under emotional excitement? I confess that I find no satisfactory answer to this question; and this case seems to me to prove that there is yet much for us to learn respecting the functions of the spinal marrow.

CASE

ILLUSTRATING THE DIFFICULTIES OF DIAGNOSIS

OF

MORBID GROWTHS FROM THE UPPER JAW.

WITH REMARKS.

BY

PRESCOTT HEWETT,

ASSISTANT SURGEON TO ST. GEORGE'S HOSPITAL, AND LECTURER ON ANATOMY.

Received November 12th.—Read December 10th, 1850.

THINKING that in the details of the following Case will be found some points of great practical interest, I venture to lay this communication before the Royal Medical and Chirurgical Society.

A man, æt. 25, was admitted into St. George's Hospital, under my care, in the month of May, 1848, with a large tumour, of an irregular shape, occupying various regions of the left side of the face. In the cheek, it formed a swelling, of the size of a turkey's egg, filling up the greater part of the superior maxillary region, the outline of the bone being perceptible to the touch in a few places only; the zygomatic arch, however, was much more prominent and more curved than natural, having been pushed forward by the growth of the tumour, portions of which could even be felt under the temporal muscle. The diseased structure was also found, in the shape of small flattened bodies, at the lower part of the orbit, lying immediately underneath the conjunctiva, and apparently quite moveable; the bones of the inner and outer walls of this cavity, as well as those forming its circum-

ference, were not in the least degree affected or displaced, but it was impossible exactly to make out the state of the bones at the lower wall, owing to the tumours which were here; the eye-ball was not more prominent than natural. Portions of the morbid growth were also detected in the left nasal fossa, from whence a small, round mass projected slightly, at times, into the pharynx; a probe was easily passed from the nostril into the pharynx, both above and below the tumour, and the finger, curved round the posterior border of the palate, there recognised a firm body which could easily be pushed from side to side; the shape of the nose was altogether unaltered. The roof of the mouth was free from disease, neither the teeth nor the bones in this region being in the least displaced; but the tumour was found extensively overlapping the front part of the alveolar process, and projecting beneath the lip. The diseased structure, wherever it could be fairly examined, appeared to be of a round shape, but lobulated; it was firm and elastic to the touch, and, at the back part of the pharynx, it was of a dead white colour and glistening appearance; in all the various regions which it occupied, it appeared to be moveable. The skin, conjunctiva, and mucous membrane of the nose, were quite healthy, and no enlarged glands could be detected in any part.

The patient stated that six years previous to his admission into the hospital, he was troubled with a disease, supposed to be a polypus of the nose, which was easily removed with the forceps; some little time afterwards, the cheek was, for the first time, observed to swell, and gradually increased in size; the tumour subsequently made its appearance in the orbit and other regions: but all this was unattended by pain, neither was there much inconvenience, except about the nostril, and even this was not very great. Finding that the tumour was steadily increasing in size, the patient, a year ago, consulted a person who attempted to destroy it with caustic, which had apparently been applied extensively in two different places, two large cicatrices being still visible in these parts; one of them, situated over the lower margin

of the orbit, had, by its contraction, caused eversion of the eyelid, the other was on the inside of the cheek. Little or no effect was produced on the disease by this treatment; the sores caused by the caustic healed kindly, and no fungating growths ever made their appearance at these spots. At various times, during the course of the disease, there had been extensive bleeding from the nose; these bleedings had somewhat reduced the patient, who was of a spare habit and pale; this paleness was accounted for by a loss of blood, which had occurred shortly before his admission into the hospital.

At a consultation of the surgeons, it having been decided that the removal of the upper jaw was justifiable in this case, I undertook the operation, the patient himself, before whom were laid all the dangers incident to it, being most urgent that something should be done for him.

Dr. Snow, to whom the surgeons of St. George's are so much indebted for the able manner in which he, for a long time, administered chloroform at the hospital, gave it on this occasion.

The patient being seated in a chair, the usual incisions were made, and the bones having been divided with a strong pair of cutting forceps, the superior maxillary and the malar were easily tilted out of their place; but it was then discovered that the disease was not connected with the upper jaw,—it was lying behind it. Hoping that I should, nevertheless, still be able to get away the whole of the tumour, I first removed the greater portion which was in view, dissecting it from off the pterygoid process to which it was attached. I then, by gently pulling, got out that part which was lying under the temporal muscle, where it was imbedded in loose cellular tissue; that portion which was in the orbit required some careful dissection, as it was partly attached to the conjunctiva. At this stage of the operation, as the patient became faint, he was placed in the horizontal posture, and a small quantity of stimulant was administered, by which means he soon rallied. I then proceeded to remove, with a pair of strong curved scissors, that portion of the tumour

which I found projecting into the nasal cavity. The pulse having again failed, the patient was at once laid on a bed, and carried into an adjoining room; different restorative means were made use of, and he appeared to rally somewhat: but shortly afterwards, observing that the breathing became difficult, Mr. Charles Johnson and myself thought it advisable, as a last resource, to make an opening into the crico-thyroid membrane, and, by means of a tube, to try and keep up artificial respiration. When the opening was made into the larynx, I observed that some frothy blood immediately made its escape; the tube was readily passed, but all our efforts were ineffectual, the patient continued to sink, and soon died.

Throughout the operation I met with but few vessels, and one only of any size; this, most probably the termination of the internal maxillary, was secured by a ligature; to the other vessels blue lint was applied: on the whole, no great amount of blood was lost, and there was no bleeding from the incision in the neck.[1]

On examining the bones which had been removed during the operation, it was found that they had both undergone very great alteration in their shape, which had been produced by the pressure of the tumour lying behind them. In the superior maxillary, the antrum was all but obliterated; the posterior wall of this sinus having been forced against the anterior one, there was merely a chink left, the cavity of which was quite free, and lined by healthy mucous membrane; and, instead of a maxillary tuberosity, there was here a depression which had served partly to lodge the tumour during life. The malar process of this bone and the malar itself, very much expanded, were much thinner, and formed a much greater curve than natural: the osseous structure itself was perfectly healthy.

Sections of the various tumours presented, both to the

[1] I have avoided entering into any details about the chloroform, as I prefer sending, with this communication, a letter which I received from Dr. Snow on the subject.

naked eye and under the microscope, a well-marked and purely fibrous appearance.

The body was examined twenty-three hours after death, and a careful dissection of the parts concerned in the disease, for which the operation had been performed, showed that the morbid growth had originated in the roof of the left nostril, and especially on the inner side of the pterygoid process and under surface of the body of the sphenoid, to which parts small portions of the tumour were still found firmly attached. The sphenoidal sinuses were filled with diseased structure and very much dilated, so much so that, at one point, the bone had altogether disappeared, and left a small hole, where the tumour was lying in contact with the dura-mater. A small portion of the growth was also found at the upper and back part of the septum nasi, which was forced over to the right side, and partially destroyed by absorption; here the mucous membrane was somewhat thickened, and there was a small pendulous body, loosely connected with the velum palati, which was hanging by the side of the uvula. Small flattened growths, of a similar nature and a bulbous shape, were found deeply imbedded in the spheno-maxillary and temporal fossæ, as well as at the back part of the orbit; they were all connected to each other; none of them had any attachments to the bones, but they were connected with the growths in the nostril by a slender pedicle passing in the direction of the spheno-palatine foramen; the growth in the orbit had reached this situation by creeping through the spheno-maxillary fissure; the bones of the orbit were quite healthy. The structure of these growths resembled that of the tumours removed at the operation,—it was purely fibrous.

The trachea and the bronchial tubes, even to their minute ramifications, contained a quantity of frothy blood. The structure of the lungs was crepitant throughout, but each section presented numerous small, dark spots of ecchymosis, produced by some of the air-cells having been also filled with blood; these organs were otherwise free from disease. The heart was healthy; its cavities contained some small black clots, but the greater part of the blood was thin and fluid,

and did not coagulate on exposure to air.—The other viscera were quite healthy.

In considering the practicability of an operation in the preceding case, the first important point to be decided was as to the nature of the tumours, for, had the disease been carcinomatous, an operation would have been, in my opinion, altogether unjustifiable; but the details of the case, and especially the length of time during which the disease had existed, led to the conclusion that, in all probability, it was not of an encephaloid nature; the general opinion was, that it was of a fibrous character. The subsequent dissection and the microscopic examinations proved this opinion to have been perfectly correct.

The next question to be examined was the point of origin of the disease; and herein lay the great difficulty of the case. After a due consideration of all the circumstances,—the appearance of the tumour in the face, the various situations it occupied, and the history, it appeared most probable that the disease, having originated in the antrum, had burst through some of the walls of this cavity and made its way into the regions in which it was found; the palate, it is true, was not depressed, neither were the teeth affected, but this did not seem sufficient to me to invalidate such an opinion; for, although a tumour originating in the antrum will generally expand the walls of this cavity, it sometimes happens that the disease makes its way in some directions much more readily than it does in others. In the museum of St. George's Hospital, there is a preparation, which I put up some years back, in which a tumour starting from the antrum had made its way upwards, outwards, and inwards, bursting the various walls, but had left the palate unaffected.

A portion of the disease had, according to the patient's account, been extracted, some years previously, from the nostril; but the gradual swelling of the face, the tumour having subsequently made its appearance in the cheek, and the nose being altogether unaltered in shape, led to the

supposition that this was one of those cases in which a tumour had made its way from the antrum into the nose, from whence it had been removed as a polypus.

The possibility of the disease having arisen in the pterygo-maxillary fossa was discussed; but the probability of such being the case in the present instance was thought to be very slight.[1]

The appearances noticed during the operation and the subsequent dissection revealed the true nature of the case. The growth, I have little doubt, began in the upper part of the nasal cavity, and from thence spread in the various directions already noticed. It had reached the pterygo-maxillary fossa, either by destroying a portion of the palate bone, or by originally passing through the spheno-palatine foramen; once in the fossa its subsequent progress may easily be traced; it passed into the orbit through the spheno-maxillary fissure; and, in the face, it had, in some parts, made the bones yield, and, in others, it had so completely moulded itself to their shape, creeping over their cutaneous surfaces, that the outlines of the bone were scarcely discernible.

That a polypus of the nose, of a purely fibrous character, should take the course which I have just described, is, I believe, of very rare occurrence; some cases have, however, been recorded, which show that these growths do sometimes make their appearance in regions where one would little expect to find them. Such was the case in a patient lately operated upon in St. George's Hospital by Mr. H. Charles Johnson, where a fibrous tumour, lying in the orbit, was ultimately traced, by its pedicle, into the nose, through a hole in the inner wall of the orbit; and yet there was nothing about this patient to lead to the supposition that the disease had originated in the nostril.

[1] A case of this nature is quoted in the twenty-third volume of the Archives Générales de Médecine,' in which a lobulated fibrous tumour, originating, according to the Docteur Del Greco's report, in the pterygo-maxillary fossa, had made its way into the various regions which were occupied by the tumour in the patient at present under consideration.

I purposely avoid alluding to the growths of an encephaloid nature, so frequently found in this locality, as their mode of progress usually differs widely from that of the purely fibrous tumour; readily insinuating themselves through the fissures, they not unfrequently make their appearance in regions far from that in which they originally began.

Some of the appearances observed in the post-mortem examination naturally lead to a question of great practical importance in the present day. I refer to the blood which was found in the air-cells and bronchial tubes. In my mind there is no doubt that that blood found its way into these parts by passing through the glottis; and if this was the case, it may fairly be asked, whether such an occurrence would have taken place had no chloroform been used,—the probabilities are that it would not. It is, I believe, now generally admitted that one of the effects, both of chloroform and ether, is to suspend the irritability of the glottis, whereby in those operations about the mouth, in which there must be a certain amount of hæmorrhage, there is a risk that some of the blood may find its way into the windpipe, without there being any cough excited to expel it; and several eminent surgeons, both abroad and in this country, have not failed, of late, to condemn the administration of these agents in operations of this nature. Some surgeons being unwilling to submit their patients to all the pain incident to such serious operations have, however, adopted a middle course, administering the chloroform in the first steps of the operation only, hoping thus to avoid all risk; but it remains still to be proved whether, even with this precaution, there may not be danger in using anæsthetics in some operations about the mouth.

Letter from Dr. Snow referred to in Mr. Hewett's Paper.

On May 18th, 1848, I administered chloroform, at St. George's Hospital, to a young man with a tumour of the superior maxillary bone. The vapour was given to him rather slowly with the apparatus which I generally employ; and he became gradually insensible, without previous excitement or struggling. In about three minutes, the inhalation was suspended, and some teeth were extracted without causing any sign of pain. A little more chloroform was given, that the operation of removing the tumour might commence, whilst the patient was under its full effect. When the inhalation was discontinued, he was in the condition that has been named the third degree of narcotism. He was passive, but the muscles were not relaxed, and the breathing was not stertorous. He remained quite silent and motionless during the early part of the operation, whilst the flaps were made, but afterwards he began to groan and move his limbs, and was not again rendered altogether insensible; for, although a few minims of chloroform were sprinkled, from time to time, on a sponge, and held near to his face, he got very little of the vapour, as the hands of Mr. Hewett and the surgeons assisting him were constantly in the way, and the cavity of the mouth and nostrils was laid widely open. The only effect, indeed, that I could produce, was partially to lull the patient, on one or two occasions. During this time, the effect of the chloroform never exceeded the second degree, or that state in which the mental functions are confused, but not suspended. He executed voluntary movements of his arms and legs. Sometimes it was necessary to hold his hands, and, at one time, he appeared conscious, for he folded his arms, as if making an effort not to raise his hands to the seat of pain. He seemed a good deal embarrassed during the operation with the blood which flowed into his throat. He leaned forward once or twice to get rid of it, and I thought that he vomited some blood on one of these occasions.

In the course of the operation, and at a time when he was but little under the influence of chloroform, the patient became faint, he was laid down, and brandy was given to him. No more chloroform was administered after this time. When I left the Hospital, a little while after the removal of the patient from the operating theatre, he was much exhausted, but seemed quite conscious, and did as he was told. There was then no difficulty of breathing, and, in my opinion, the influence of the chloroform had altogether left him.

CASES OF

RUPTURE OF THE LIVER OR SPLEEN.

WITH REMARKS.

BY

ATHOL JOHNSON,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS,
SURGEON TO THE ST. GEORGE'S AND ST. JAMES'S DISPENSARY, AND
LECTURER ON PHYSIOLOGY AND GENERAL ANATOMY AT ST. GEORGE'S HOSPITAL.

Received December 24th, 1850.—Read January 14th, 1851.

THE following Cases came under my notice whilst House-Surgeon to St. George's Hospital in the year 1845.

CASE I.—*Rupture of the Liver and Right Lung. Death almost immediate.*—John Pratt, æt. 25, was brought to St. George's Hospital on the 4th of April, 1845, having fallen from a scaffold about thirty feet high, a short time previously. He was perfectly sensible when admitted; but was in a state of extreme collapse, with very exsanguine features, and complained of intense pain in the abdomen, which was swollen and tense: there was also much difficulty of breathing, with dulness over the right lung. He never rallied; but died in about an hour.

On examination of the body after death, a large quantity of blood, not coagulated, was found in the cavity of the peritoneum; it had proceeded from an extensive laceration of the liver, penetrating deep into the structure of this organ, and principally situated at the upper surface of the right lobe; the structure of the liver was healthy.

The cavity of the right pleura also contained a large quantity of blood, and the right lung presented two very

extensive lacerations penetrating deep into its structure. None of the ribs were fractured; but the costal cartilages, from the fourth downwards, were separated from their connections with the sternum, and in one or two places the parietal pleura was torn through.

The left arm and leg were also fractured.

CASE II.—*Extensive Rupture of the Liver, with Effusion of Blood and Bile into the Peritoneum. Death on the third day.*—James Lucas, æt. 40, admitted into St. George's Hospital under the care of Mr. Cutler, May 20, 1845. This patient, shortly before his admission, was knocked down by a horse, and the wheel of a carriage passed over his belly. He was in a state of extreme collapse, with bloodless features, and complained of intense pain over his abdomen, which was considerably distended; some of the ribs on the right side were felt to be fractured. He was placed nearly in a sitting posture, by means of a bed-chair;—a roller applied round the ribs, and a draught containing morphia ordered every four hours.

The pain gradually subsided, though he remained very exsanguine, and he appeared to be gaining some strength, when he died suddenly, three days after the accident, on attempting to raise himself up, to get upon a bed-pan.

The post-mortem examination disclosed the following appearances:—There was a bruise over the anterior wall of the abdomen. The cavity of the peritoneum was filled with a large quantity of blood, the greater part of which was fluid. The convolutions of the intestines were glued together by the fibrin of the extravasated blood, which had partially lost its colour, and formed slender adhesions, which were easily destroyed by separating the parts. After the removal of the blood and fibrin, the parts underneath were found to be discoloured, but presented no increase of vascularity. There was an extensive rupture of the liver, extending through the whole thickness of the right lobe, as well as through the lobulus Spigelii. The ruptured parts were well adapted to each other, and pretty firmly united

by the fibrin of the extravasated blood. The whole of the blood contained in the peritoneum was deeply bile-tinged. The other abdominal viscera were healthy.

The fourth, fifth, and sixth ribs on the right side were fractured near their posterior extremities.

CASE III.—*Extensive Laceration of the Spleen, with slight Laceration of the Liver. Death on the third day.*—John Jolliff, æt. 32, admitted into St. George's Hospital, August 14th, 1845, under the care of Mr. Tatum. This patient was reported to have fallen from a height of thirty feet, striking his side against a pole. When brought in, he was in a state of complete collapse, with blanched skin, and complaining of excruciating pain in the abdomen, which was hard and swollen; one of the lower ribs on the left side was found to be fractured. He was placed in bed, with his shoulders raised on a bed-chair, and doses of morphia in camphor mixture given occasionally. He still continued very pale, and in the evening was slightly sick.

The pain gradually subsided, and with the exception of being troubled occasionally with flatulence, he appeared to be going on well till the night of the third day after the accident, when, contrary to the directions which had been given, he got out of bed for the purpose of having it made. He was almost immediately seized with faintness, and died in half an hour.

Examination after Death.—The cavity of the abdomen contained a large quantity of bloody fluid, mixed with dark coagula of blood; these had proceeded from an extensive laceration of the posterior margin of the spleen, which was of a pale colour, soft and grumous, and in several places mixed with circumscribed extravasations of blood. A small laceration also existed at the upper surface of the left side of the liver near the spleen. The other viscera were healthy.

The tenth rib on the left side was fractured in two places.

CASE IV.—*Extensive Ruptures, perfectly united, about the*

Liver and right Kidney. Death from Fracture of the Spine, three weeks after the accident.—James Doyle, æt. 38, admitted into St. George's Hospital under the care of Mr. Hawkins, having fallen from a hay-rick about thirty-five feet high, striking his back against a log of wood. There was complete loss of voluntary motion and sensation in the parts below the nipples of the breast, respiration being carried on by means of the diaphragm.

The right arm was completely paralysed, and the left partially so: he complained of much pain in the arms, and also in the abdomen (which was a little distended), although the parietes were quite insensible. He was also in a state of considerable collapse, which continued for several hours.

The urine, which was regularly drawn off, contained considerable quantities of blood. Sloughs gradually formed upon the back and other parts subjected to pressure; the respiration became impeded, and he died exactly three weeks after the accident.

Sectio Cadaveris.—The body of the seventh cervical vertebra was found broken up into several fragments, blood was effused upon the external surface of the spinal dura mater, and the spinal cord in this situation was softened and diffluent to the extent of about an inch and a half. The lungs were gorged with red frothy serum, and their tissue a little softened.

The cavity of the peritoneum contained a little bloody serum, and some blood was found extravasated in the subperitoneal areolar tissue of the right loin, extending from the right hypochondrium into the pelvis; this extravasation had evidently existed for some little time, as the blood had lost a large portion of its colouring matter. An extensive rupture was found on the upper surface of the right lobe of the liver; this rupture, which measured five inches in length, was perfectly united, with the exception of some few points where the peritoneal coat still remained broken; but no lymph was found on the serous membrane, which retained its polished appearance. The rupture did not extend very deeply into the organ. Another smaller rupture, also per-

fectly united, was found in the neighbourhood of the large one.

Several ruptures, beautifully united, but not extending more than two lines in depth, were found on the anterior surface of the right kidney; no inflammation existed about this organ, or in the surrounding areolar tissue.

CASE V.—(*Supposed*) *Rupture of the Liver. Recovery.*—Emma Mason, æt. 6, was admitted into St. George's Hospital under the care of Mr. Keate, on the 5th February, 1845. She was in a state of complete collapse, but sensible, and complaining excessively of extreme pain in the abdomen, which seemed full and tense:—there were some slight graizes of the skin over the situation of the liver, produced by the passage of the wheel of a cart over the belly shortly before admission.

The patient gradually recovered from the collapse, but remained very pale and exsanguine, and continued to complain for some days of pain in the abdomen, especially about the right hypochondrium; no febrile symptoms, however, supervened, and the pain gradually subsided. She was removed home by the mother about the ninth day after the accident. I continued to see the child, who remained weak and pale for some time after the accident, but gradually regained her health and strength.

REMARKS.—I have ventured to bring these cases before the Society with the view of illustrating a kind of accident of not very infrequent occurrence, as is shown by the fact that these five, together with four other cases, came under my care as House-Surgeon in St. George's Hospital during a single year.

The general character of the symptoms in all the cases which I saw, was very similar:—Extreme collapse, combined with the very exsanguine appearance of the patient; intense pain in the abdomen, especially in the region of the liver or spleen, coming on immediately after a severe blow in that situation; together with the more or less distended state of

the belly, the distension not being entirely tympanitic;—were usually sufficient to induce me to suspect that such an injury had occurred. That the pain which is usually so much complained of in the first instance is not inflammatory, is, I think, shown by the first four of these cases; for in these instances, though some days had elapsed from the time of the injury, no appearance of inflammation was found; the pain being due, I believe, at first, rather to the laceration and sudden stretching of the peritoneum, largely supplied as it is with nerves from the sympathetic system.

The principal point of interest, however, about these cases, is, I think, as respects the prognosis. This, of course, is very unfavorable, but still I believe that the injury, if of moderate extent, is not necessarily fatal; this, I conceive, being satisfactorily shown by the fourth case, which appears to me to be a very interesting one, as, in this instance, an opportunity was afforded, by the patient dying from the effects of a totally distinct injury (fracture of the spine), of demonstrating, by a post-mortem examination, that the liver, as well indeed as the kidney, had been lacerated, and that union had taken place, without, apparently, any amount of inflammation having been set up.

I believe fully myself that the liver had also been ruptured in the fifth case; and such was the opinion expressed at a time when there appeared every probability of the child dying. As, however, the patient recovered, and no opportunity, consequently, was afforded of demonstrating that such an injury had actually taken place, this case is not of so much value as the previous one, as many might fairly doubt whether some error had not been committed in the diagnosis.[1]

[1] Since this paper was read at the Society, Mr. Macilwain has directed my attention to two cases of incised wounds of the liver, which, although not exactly in point, are interesting.

One (recorded by Fab. Hildanus) of a Swiss, who received a wound with a broadsword; hæmorrhage *ad deliquium* followed, and the surgeon, finding a piece of the liver protruding at the wound, removed it. The man seems to have had a difficult, but still a perfect, recovery. He died three years

With regard to the treatment, it was directed to the following points:—

1st. Instead of hastily administering brandy and other stimulants, rather to favour the state of collapse, guarding, of course, against its going too far, in the hopes of checking the hæmorrhage at the time, and allowing coagulation to take place so as to arrest it in a more permanent manner.

2d. To keep the patient in a state of the most perfect rest, not allowing him to make any exertion himself, and to place him in such a position that breathing might be carried on with the least possible disturbance of the abdominal viscera. The bowels also ought not to be disturbed for some days.

In the Second and Third cases related, it was owing to some imprudence on the part of the nurse or the patient, that fresh and fatal hæmorrhage appeared to have occurred.

And 3dly. To prevent the patient from tossing about, as he is inclined to do from the violence of the pain, and so tending to produce fresh bleeding, opiates were freely administered. Of these morphia, given in full doses, with a little

afterwards of fever, when the remaining portion of the liver was found to be healthy.

The other case was related by Mr. Scrivens at the London Medical Society in 1828. A man stabbed himself with a carving knife: he bled *ad deliquium;* but rallying, went on very well for eleven days, when he went out and drank freely of spirits. Peritonitis supervened, which proved fatal. On examination there was found a "considerable" wound of the liver perfectly healed.

I might also refer to some experiments on rabbits performed by Dr. Monro, as quoted in Hennen's 'Military Surgery,' in which it appeared that considerable portions of the liver might be removed without injuring the health of the animal, the wounds cicatrizing as in other parts.

Mr. Macilwain observes very justly, that so many of these cases prove fatal from adventitious causes, that it is extremely desirable to adopt every means of improving our diagnosis; this, he considers, would be materially assisted if those varieties which are observed in the nature, duration, and other details of that stage, which we now designate by the general term "collapse," were more particularly recorded.

ether and camphor mixture, if the collapse were excessive, seemed to agree the best.

I may mention, in conclusion, that I have looked over several books upon the subject, but am not aware that any case has been published to prove that union has actually taken place after rupture of the liver or spleen, without any external wound.

ACCOUNT OF A CASE

IN WHICH THE

CÆSAREAN SECTION WAS PERFORMED;

WITH

REMARKS ON THE PECULIAR SOURCES OF DANGER ATTENDANT ON THE OPERATION.

BY

CHARLES WEST, M.D.

PHYSICIAN-ACCOUCHEUR TO ST. BARTHOLOMEW'S HOSPITAL, AND LECTURER ON MIDWIFERY IN THE MEDICAL COLLEGE.

Received December 20th, 1850.—Read January 28th, 1851.

THERE are some subjects connected with the exercise of our profession, concerning which scarcely any one can be said to have experience, but each has to fall back upon the accumulated observation and experience of many others. This circumstance attaches a real value to the publication of isolated cases, and must serve as my apology for bringing the following history before the notice of the Fellows of the Medical and Chirurgical Society.

Elizabeth Williams was one of eight children, of whom seven reached adult age. Her father, who had been insane for some years previously, died at the age of 78, her mother at that of 68. Two of her brothers and one sister died of phthisis, and this sister was insane for some years before her death. Two brothers and a sister survive in good bodily health, but the sister is of weak intellect; and Elizabeth herself had, on more than one occasion, shown indications of insanity.

As a child, E. Williams's health had been good, but it became much impaired about the age of 15, when she began to menstruate; and ever since then she had frequently, indeed almost constantly, suffered from pain in the back, referred especially to the pelvis. About the age of 23 the pain became much severer than it had ever been before; but, in spite of this, and of the advice which she received from some medical man not to marry, she married, at the age of 25, the husband of her deceased sister. She did not become pregnant until fifteen months after marriage; but conception was followed by a very considerable increase of pain, associated, during the latter half of her pregnancy, with a great and rapidly increasing difficulty in walking. For some weeks before her confinement she did not move further than from her bedroom on the second floor to her sitting-room on the first floor, where she generally spent the whole day lying or sitting upon her sofa. Sometimes, however, she moved about her room, and, on the day before her confinement, was occupied in putting up curtains to the windows; her disinclination to walk seeming to be due, at least, as much to her nervous temperament and wayward disposition, as to any physical incapacity for exertion.

She was in the fifth month of her pregnancy when she placed herself under the care of Mr. Wren, of Brownlow-street, to whose kindness I am indebted for many facts in her history, as well as for the permission to lay her case before this Society. There was nothing in her appearance, either when she first came under Mr. Wren's care or subsequently, to suggest the idea of her being deformed; the only peculiarity which she presented being that she always stooped very much forwards. During her pregnancy her bowels required the constant use of purgatives; her appetite was bad, she was much annoyed by heart-burn, had occasional faintings, and suffered much from palpitation; her pulse beating habitually 120 in the minute, (a rate of frequency which she said it had manifested for years), but varying under every source of excitement. She was nervous and excitable in the highest degree, looking forward with much

apprehension to her labour, and especially to the pain attending it; and was urgent in extorting a promise that she should be permitted to inhale chloroform when labour came on.

It was in this unfavorable state, both of body and mind, though much benefited by Mr. Wren's treatment, that Mrs. Williams reached the end of her pregnancy, and labour-pains came on at 1 a.m. on the 7th of May, 1850; she having been married just two years, and being in the 27th year of her age.

Mr. Wren was summoned at 3 a.m., and discovering, on his first examination, the existence of extreme pelvic deformity, despatched a messenger for me; and I arrived at a quarter to 5 a.m. I learned that the pains which the patient had had were very feeble, and returned only about every quarter of an hour. She bore them, however, very ill, tossing about the bed, crying out for chloroform, and becoming almost unmanageable on any attempt to make a vaginal examination.

She was a small, slim person; and as she lay in bed presented no sign of deformity, and her extremities were straight and well formed. Her face was pale, and her pulse frequent and feeble. On examining her spine it was found to be perfectly straight, but the sacrum was bent into an almost semicircular form, with a great convexity projecting backwards; the pubic arch was a little wider than would suffice to allow of laying one finger between the rami of the pubes; the tuberosities of the ischia did not seem to be much above an inch apart, and the rami of the pubes ran out into a sort of beak; the bones being bent at the junction of the pubis and ischium, and being at this point not more than an inch apart.

The os uteri could be reached with difficulty; it was open to about the size of half a crown; its lips were still thick, but soft.

At a quarter to 10 a.m., Dr. Ramsbotham and Dr. Murphy saw the patient with Mr. Wren and myself; her case appearing to us to be one in which, even irrespective of the interests

of the child, the Cæsarean section was called for. Auscultation, moreover, had ascertained the child to be living.

Pains had occurred, though feebly, since 5 a.m., and the os uteri was now found by Dr. Ramsbotham to be fully dilated. During his examination the membranes broke, and liquor amnii escaped, though not in any large quantity. The head was found to be presenting.

The circumstances which seemed to point out the Cæsarean section as the only admissible proceeding, were not merely the probability of the existence of a very considerable degree of contraction of the pelvic brim, but also the extreme narrowness of the outlet, which would render the introduction of the hand to guard the embryotomy instrument impossible; while even supposing the head of the child to have been so mutilated, as to admit of its extraction, it was yet doubtful whether the body could be extracted, and the rather, since the narrowness of the outlet would quite prevent any attempt at evisceration from succeeding.

On the other hand it might be alleged, that though any attempt at extracting the child would be both dangerous, difficult, and tedious, and would most likely occupy some two or three hours, yet it could probably be effected. Although it was quite true that, should serious difficulty occur in extracting the body, it would not be possible to eviscerate the child, yet the chances were against the existence of any such difficulty as to be absolutely insurmountable; while, though injury might be inflicted on the mother, yet injuries to parts within the pelvis being so much less formidable than injuries to the uterus itself; the endeavours to deliver by the natural passages would, on the whole, be preferable, as far as the mother was concerned, to the more hazardous experiment of the Cæsarean section.

Dr. Ramsbotham's opinion inclined to the latter view; but although he thought the fœtus might, by great exertion, be dragged through the pelvis after craniotomy had been effected, he nevertheless acquiesced in the view that Dr. Murphy and myself took, of the great danger necessarily attending such forcible efforts; and this, in addition to the

possible chance of ultimate failure, induced him to agree with us, and to sanction the performance of the Cæsarean section. It was determined to request Mr. Skey, who was the only surgeon in the metropolis who had ever performed the operation on the living subject, to undertake it. To this request Mr. Skey kindly acceded, after he had been made acquainted with the particulars of the case; and it was in conjunction with him that the subsequent treatment of the patient was carried out.

As no circumstance seemed to indicate the necessity for earlier interference, 4 o'clock p.m. was the hour fixed for the operation. For permission to lay before the Society the details of its performance, I have to acknowledge my obligation to the kindness of Mr. Skey.

On assembling at 4 o'clock, we found that the patient had had but very little uterine action; her bowels had been relieved by an enema, and she had taken a little beef-tea occasionally. The necessity for the performance of the Cæsarean section being explained to her, she readily consented to undergo it, but on condition that she should be previously rendered insensible to pain by the use of chloroform; and no representation of the comparatively slight suffering which the operation would occasion, or of the possible increase of danger to which the employment of chloroform might expose her, could at all shake this resolution.

On receiving the assurance that her desire, in this respect, should be complied with, she at once became contented, went quietly through all the preliminaries of the operation, and, during her subsequent illness, showed a remarkable degree of equanimity and patience, which were interrupted only when the wound was dressed, and the apprehension of pain then rendered her immediately excited, and difficult to manage.

The patient was now placed on a table, with her feet resting on two chairs, and her shoulders somewhat raised; the catheter was passed, and a small quantity of urine drawn off; the fœtal heart was distinctly heard, beating in the

right half of the abdomen, but the uterine souffle was not clearly perceived anywhere; facts, the inferences from which were confirmed during the operation.

An assistant being stationed on each side of the patient, to prevent the escape of the intestines, and the inhalation of chloroform having begun, Mr. Skey now marked the line of the incision with ink; and so completely was the contour of the abdomen altered by the contraction of the pelvis, that the incision, seven inches in length, was carried two inches above the umbilicus, and down to the commencement of the pubic hair, and it was afterwards found necessary to carry it an inch higher.

Inhalation of chloroform began at 18 minutes past 5; at $25\frac{1}{2}$ minutes past 5 the first incision was made, and at $31\frac{1}{2}$ minutes past 5 the child was extracted, the operation having been somewhat delayed by the circumstance that the patient began to struggle after the first incision, so that it became necessary to pause, in order to give her more chloroform.

The abdominal integuments were extremely thin; no bleeding took place from them. On opening the peritoneum, about a drachm of transparent serum escaped; and on dividing it to the whole extent of the external wound, the uterus presented itself, occupying it so completely that no intestines were to be seen. The uterus was turned obliquely on its long axis, the right fallopian tube and ovary being distinctly in view, the front of the uterus looking towards the left side, and the organ corresponding in its direction very nearly to that of the left oblique diameter of the pelvis. Care was taken, however, to make the incision in the mesial line of the uterus. The walls of the outer half of the uterus bled comparatively little; but the bleeding from the vessels of the inner half was free, though not alarming. The total thickness of the uterine wall was about three quarters of an inch. The cavity of the uterus was opened at the lower part of the wound, and a director of peculiar construction, invented by Mr. Skey for the purpose, and used by him in his former operation, was then introduced, and the incision carried upon it quite up to the fundus of the womb. The

child was now seen lying in the third position of Naegele (the second of most authors), namely, with its back to the right, and forwards. The membranes were at once torn through, and the child, a fine girl, was taken out. Its surface looked slightly livid, and for a few seconds it did not cry. It then, however, began to breathe, and in two or three minutes cried loudly, without any measures having been needed to resuscitate it. It may, perhaps, be as well to add, that the child still survives, and is in good health.

The uterus did not contract much; it diminished, indeed, in length, but the wound remained widely open, and the placenta was seen attached to the posterior part of the organ. The uterine cavity was now filled with blood, and the placenta looking as if it were entirely detached, it was removed by Mr. Skey; who found, however, that its complete separation required rather firm traction.

No sooner was the placenta removed from the uterus, than the blood welled up from it, partly from its interior, partly from its cut edges, just like water gushing from a spring; a profuse, steady, uniform stream running down upon the floor, and which seemed, for a few seconds, as though it would not cease so long as there was any blood to flow. From a pint and a half to a quart of blood was thus lost; and, during the continuance of this very profuse bleeding, the patient's pulse became very feeble, though it never altogether ceased; while, owing to the insensibility previously produced by the chloroform, it was some minutes before she could attempt to swallow. The first indication of returning consciousness was furnished by several violent attempts to vomit, during which the intestines (especially on the left side of the uterus), which had come into view immediately on the removal of the child, prolapsed, and could with difficulty be retained in the abdomen, even by closing the integuments over it.

By degrees the hæmorrhage abated; no other means having been resorted to, to excite uterine action, than moderate pressure with the hand on the abdomen. At 6 p.m., the hæmorrhage had quite ceased, though the uterus

was not firmly contracted, nor the wound closed tight. Five sutures were now placed in the abdominal integuments, the last, one inch and a half above the lower edge of the wound; a space being left here at my request, in compliance with the suggestion of some continental surgeons, who attach importance to an aperture being left for the escape of the discharges from the uterine wound. Broad strips of plaster were next applied; and an eighteen-tailed bandage, which had been placed under the patient before the operation was begun, was now brought together over some large sheets of cotton wool, which served to protect the abdomen from pressure.

The patient was now carefully lifted into bed; and immediately on being placed there, efforts at vomiting came on, during which firm pressure was made on her abdomen, to prevent, if possible, protrusion of the intestines. As soon as they had a little subsided, sixty drops of Tincture of Opium, were given in a little brandy, but were almost immediately rejected, and she refused to take any more laudanum, saying it would make her vomit.

At this time, though her pulse was extremely feeble and her extremities were cold, yet her mind was calm and collected, nor did her intellect become at all disturbed, until within an hour or two of her death.

Two doses of morphia were given her between 7 and 10 p.m., but both were rejected soon afterwards, and the patient made frequent efforts to vomit during the first two hours after the operation. At 10 p.m., however, she expressed herself as feeling comfortable, and her pulse, though extremely feeble, did not exceed 108 beats in the minute. On examining the wound, a portion of omentum was seen to have escaped beneath the lowest suture, and having been returned with some difficulty, an additional suture was put in to close the lower edge of the wound, and the renewal of the accident was thus prevented.

In consequence of the irritability of her stomach, it was determined to endeavour to keep the patient under the influence of opium, and to supply her with nourishment mainly by means of enemata; and accordingly a drachm and a half

of laudanum was thrown into the rectum at midnight; and was followed in about an hour by an enema of four ounces of strong beef-tea, thickened with isinglass. The laudanum in smaller doses and the beef-tea were given in enemata at intervals of about every four hours; so that during the first sixty-two hours after the operation, ʒv ɱxiv, of the former, and ℨxlviii of the latter, were thrown into the rectum; the beef-tea being thickened with isinglass, and occasionally mixed with brandy.

From the time of the operation to her death, the patient was watched incessantly by Mr. Cupiss, Mr. W. H. Stretton, Mr. Arthur Stretton, or Mr. Hillier, four very intelligent students at St. Bartholomew's, who not only did everything which the most unwearied care could do to save her, but also recorded, with the minutest accuracy, every change in her condition.

For the first twenty hours she dozed at intervals, though she continued in a state of great depression and vomited occasionally; but the irritability of the stomach gradually diminished; the lochial discharge appeared, and continued to flow scantily, but without any unnatural character during the remainder of the patient's life. She passed water, throughout the whole of her illness, without any difficulty, and suffered scarcely any pain; while the distressing efforts to vomit were always relieved, sometimes entirely arrested, by firm pressure upon the abdomen. Her condition during the 8th of May continued one of great depression; and though her sickness was less, yet she took nothing more than a little ice, and a spoonful of milk occasionally. Her pulse was 148 at 10 p.m.; having been 160 at the same time on the previous day. Moreover, she bore the cutting off some of her soiled linen very well, and expressed a wish for some wine.

She passed the night of the 8th of May on the whole comfortably, dozed a good deal, and took wine-and-water frequently; but was slightly sick at 5 a.m., on the 9th; when she threw up a little clear fluid, being the first time of her vomiting for more than twenty hours.

During the day she took sago and milk readily, but refused

wine; and continued apparently better till half past 3 p.m., when she vomited a dark brown, offensive fluid; and this vomiting recurring thrice before 10 p.m., left her evidently deteriorated, and she passed a more restless night than the preceding one had been.

At a quarter to 7 a.m., on the 10th, vomiting of green matter had returned, and the patient seemed more feeble. She had taken very little by the mouth, and the disposition to sickness and distaste for almost everything, with the inability to bear more than a teaspoonful or two of any nourishment at a time, interfered greatly with all endeavours to support her powers. She had complained sometimes of headache, especially when sickness was felt; and it became a question with Mr. Skey and myself whether any advantage likely to accrue from the continuance of the laudanum in the enemata was such as to counterbalance the possible evil of maintaining a constipated condition of the bowels, and of keeping up or aggravating the patient's sickness. The character of the matters vomited seemed, indeed, to point to a more serious and less remediable cause; but still it was determined to try the effect of omitting the laudanum.

Various stimulants and various articles of food were tried during the course of the day, but she took very little of any; champagne and ice being the two things that seemed most grateful to her. She had one or two returns of green vomiting during the day, but did not appear, at 11 p.m., to have at all retrograded since the morning.

She became very restless, however, and was sick twice after 11 p.m.; the opium was accordingly resumed in the enemata, and early on the morning of May the 11th, small doses of the black drop were given every two hours at Dr. Murphy's suggestion. By 3 p.m., under the continuance of the opium and the enemata of beef-tea, with such small amounts of food and stimulants as she could be induced to take, she rallied surprisingly; the lochial discharge, which had almost ceased for the previous twelve hours, reappeared; and her pulse, which had ranged at about 140 to 150, though still 146, was somewhat less feeble.

At 3 p.m., Dr. Ramsbotham, Dr. Murphy, Mr. Skey, Mr. Wren, and I, saw her together, and felt more hopeful about her than at any time for the previous twenty-four hours. There was, however, one bad symptom about her even then, which was that her temperature, which during the night had sunk very low, continued so, and that there was a cold perspiration upon her surface. Almost immediately after this visit, too, the other favorable symptoms began to disappear; her skin became quite cold, her pulse thready, and she sank into a state of collapse like that of a cholera patient, her intellect continuing clear, and considerable muscular power remaining, until within a couple of hours of her death, which took place at half-past 6 a.m, on May 12th; 108½ hours after the operation.

At the examination of the body 33½ hours after death, the abdominal cavity and the pelvis were alone examined.

Decomposition had already advanced; the body gave out a very offensive odour; there were livid spots on the surface of the abdomen, which was tympanitic.

The external wound was now six inches long; union had taken place for about two inches at its lower edge, and about the situation of the fourth suture, but elsewhere its edges were gaping.

A portion of healthy omentum, about two inches long, was found lying free at the lower edge of the wound beneath the integuments, but external to the peritoneal cavity.

There was no effusion of fluid into the abdominal cavity; the viscera were all exceedingly bloodless, but a thin layer of dirty yellow lymph connected the opposite surfaces of the pale, large intestines to each other, and also at some points united the intestines to the uterus.

A thick layer of yellow lymph lined the abdominal walls from the umbilicus downwards. On stripping it off, the peritoneum appeared thickened, and destitute of its natural polish, but scarcely, if at all, increased in vascularity. The intestines contained very little fluid, no solid fæces, some flatus.

The bladder was empty and flattened, and appeared to have adapted itself to the altered shape and relations of the parts, being almost completely out of the pelvis. It was quite pale and healthy.

The uterus was moderately contracted, but not the slightest effort had been made to close the wound, the external edges of which were retracted, and lay at least an inch apart, while the internal edges were but just in apposition.

At the wound, the substance of the uterus looked swollen and infiltrated, the wall there measuring 1·2 inch in thickness, while at the fundus of the organ it was only ·7 thick. The length of the external uterine wound was 3·65 inches; of the inner 2·5. The edges of the wound were covered by a thin layer of a dirty brownish matter, in all probability altered blood; beneath which they were of a pale dirty, straw colour. Elsewhere the substance of the organ was pale and bloodless, looking as white as veal; presenting no sign of inflammation, no thickening of its veins, neither coagula nor blood in their channels.

The placenta had been attached posteriorly near the fundus of the uterus, but rather to its left side. The surface to which it had been attached looked quite healthy, as did the whole interior of the uterus, and also the vagina, in neither of which was there any blood nor any sort of morbid secretion.

The pelvis was a very well-marked specimen of the deformity produced by mollities ossium.

The lumbar vertebræ had been driven down into the pelvic cavity, so that, as the body lay upon its back, a line drawn from the symphysis pubis directly backwards, touched the upper part of the fourth lumbar vertebra.

The length of such a line was 4·2 inches.

Transverse diameter of the brim 4· „

The rami of the pubes were projected forwards into a beak, the width of which was ·75 of an inch, while its length, measured from the inner surface of the symphysis, was 1·2 inch; by which the antero-posterior diameter was reduced to 3 inches.

The bodies of the fourth and fifth lumbar vertebræ were much flattened, so that from the upper part of the fourth to the upper part of the sacrum they measured only 1·5 inch.

The sacrum was so greatly curved that from about its third vertebra it ran horizontally forwards. The depth of the bone to the point where it bent forwards, was rather less than one inch and a half; while from the point of the coccyx along the horizontal part of the sacrum it was 2·75.

Distance between the two anterior superior spines of ilia . . .	8	inches.
„ „ tuberosities of ischia	1·2	„
„ „ point of coccyx, and summit of the pubic arch	2·8	„
„ „ rami of the pubes at the lower edge of the beak	1·05	„
Width at the upper part of the pubic arch	·6	„

Agreeing, as I do, most cordially with the rule laid down in British Midwifery, which gives the mother's life a claim paramount to every other consideration, it cannot but be with a feeling of deep regret that I am compelled to add another to the already long list of failures of this operation. Happily, however, in this instance, the painful question which sometimes besets us after an unfortunate operation, as to

[1] I am acquainted with 409 authentic cases of the Cæsarean section, 341 of which are collected in Kayser's very valuable essay 'De Eventu Sectionis Cæsareæ.' In 251 of these cases the mother died; in 158 she survived. The fate of the children is mentioned in 347 instances: in 110 of which they were still-born, in 237 they were born living. There can, however, be no doubt but that these figures convey a very exaggerated impression as to the proportion of recoveries, and that the unfavorable estimate of English authors is nearer the truth. Both Kayser and Naegele regard the results given by the published cases as unfair; and the former mentions the fact, which of itself affords strong evidence on this point, that while the total maternal mortality among the cases which he had collected was 63 per cent., the mortality of cases occurring in lying-in hospitals, in which institutions failures must, of necessity, be reported as well as successes, amounted to 79 per cent. This last figure does not differ very materially from that afforded by the cases occurring in this country; 49 of which yield 7 recoveries, (or 8, if Mr. Whitehead's case, where the patient survived till the thirty-second day, and died then chiefly from the advance of disease in her hip, be classed among the number;) the rate of maternal mortality being in the former case 85·7, in the latter 83·6 per cent.

whether some different course might not have been adopted with better prospects of success, does not arise; since the extreme degree of pelvic deformity must have rendered any attempt at extracting a mutilated child almost certainly unsuccessful; while the absence during pregnancy of evidence of the contracted state of the pelvis, sufficiently accounts for no measures having been adopted for the induction of premature labour.

But though there was here no alternative left, and though if a similar case presented itself to me to-morrow, I should again advise the same course, yet it cannot be denied that the Cæsarean section is attended by perils peculiar to itself, such as beset no other operation either in surgery or obstetric practice, and which, I confess, would make me shrink from recommending its performance in every instance where the way seemed open for any other proceeding.

The dangers peculiar to this operation, and inseparable from it even when most carefully performed, may be referred to the following four heads:—

1. The danger arising from hæmorrhage, which proceeds from a source different from that whence bleeding takes place in any other operation, and which is not capable of being arrested by the same means as suppress it under ordinary circumstances.

2. That dependent on the shock inflicted on the nervous system, as well by the violent interference with the most important process that ever goes on in the organism within the same limited time, as by the injury to a part so important and so richly supplied with nerves as the uterus of a parturient woman.

3. The hazard inseparable from extensive injury to the peritoneum, when unblunted in its sympathies and unaltered in its texture, as in cases of ovarian or other tumours, for the removal of which a similar exposure of the abdominal cavity is sometimes practised.

4. That which results from the infliction of a wound on the uterus, at a time when, in the ordinary course of things, the processes which nature is prepared to carry on in it,

consist in the desintegration and removal of its tissue; the very opposite, indeed, to those essential for the repair of injury.

To all, except the last of these sources of danger, attention has been more or less directed; but still the amount of peril to which the patient is exposed from each, has, perhaps, been scarcely sufficiently investigated.

Kayser, in his valuable essay on the Cæsarean Section, states the cause of death in 123 cases; in 77 of which the patient died of inflammation, in 30 from the shock to the nervous system, in 12 from hæmorrhage, and in 4 from some accidental occurrence not of necessity associated with the operation. In some of these cases, however, no post-mortem examination was made; in others the date of the patient's death is not stated; while in several, more than one of the above-mentioned causes had contributed to occasion the patient's death. Selecting, therefore, such of Kayser's cases as were complete in all respects, and adding to them such others as have since come to my knowledge with the requisite details, I have drawn up the accompanying table, as affording some approximation to a correct view of the causes of death after the Cæsarean section.

From this table[1] it appears that, in 41 out of 147 cases, a notable amount of hæmorrhage occurred either during the operation or subsequent to it; and in a third of this number hæmorrhage was the sole cause of the patient's death. In seven instances the hæmorrhage arose, in great measure, from the placenta being wounded in the course of the operation; an accident which probably might be avoided in the majority of instances, by careful preliminary auscultation. In twenty instances it occurred at the time of the operation, and proceeded in part from the edges of the wound, in part, and usually in greater measure, from the seat of the placenta, and followed its detachment or spontaneous separation. In the remaining fourteen cases the more important bleeding was secondary, taking place after the completion of the operation and closure of the wound, escaping externally

[1] *Vide* p. 80.

in one or two instances, but in the other cases being poured out into the abdominal cavity, and being discovered in the form of coagula of greater or less magnitude, on examination of the patient's body after death.

Against this hæmorrhage the resources of art can effect but little. The injury of the uterine substance can hardly fail to impair the contractile power of the organ, while that arrangement of the uterine sinuses which tends to prevent the occurrence of hæmorrhage after the separation of the placenta, even where the womb remains uncontracted, can be of no service in checking the bleeding from the wound.

It does not seem easy to say why profuse bleeding has occurred in some cases and not in others, and the impossibility of estimating the dangers of the operation before-hand with any near approach to correctness, is to my mind by no means the least of the difficulties that attend upon it. It may, perhaps, be thought that, in the case related above, the administration of chloroform had something to do with the very tardy contractions of the uterus; and my own experience of this agent, which I frequently employ in obstetric operations, inclines me to believe that this may have been the case, though it must not be forgotten that the uterine action was very feeble even from the commencement of labour. Serious hæmorrhage attended on four[1] out of seven cases of the Cæsarean section in which anæsthetic agents were employed; but in two[2] the action of the uterus continued vigorous, although the patient was in a state of complete unconsciousness; while Mr. Skey's patient, on whom he operated at St. Bartholomew's, was never thoroughly under the influence of the ether; and the hæmorrhage in Dr. Nimmo's recent case depended, in great measure, upon the placenta having been wounded. The risk of serious hæmorrhage is doubtless diminished by not operating till after the

[1] Namely, the present case, and those of Mr. Skey, Dr. Nimmo, and Professor Hüter; numbers 109, 111, 102, and 8 in the Table of reference.

[2] The cases of Mr. Campbell, No. 60, and Dr. Oldham, No. 131; besides which it was employed with advantage in Dr. Oldham's late successful case, reported in the 'Medical Times' of August 16, 1851.

liquor amnii has escaped or been evacuated; but the danger of exciting violent peritoneal inflammation, is probably a sufficient reason against following the practice of Professor von Ritgen of Giessen,[1] who advises that the uterus be drawn forwards, and surrounded with sponges dipped in cold water, till vigorous and permanent contraction has been induced; though in one or two cases which terminated successfully this proceeding has been adopted.

The shock to the nervous system is a very serious cause of the mortality of patients who undergo the Cæsarean section. In thirty-three of 147 fatal cases, the patient sank under the shock; no hæmorrhage having either attended the operation or followed it, and no morbid appearances having been discovered after death. In eleven cases more, though the more prominent symptoms during life were those of shock, yet examination after death discovered the effects of previous inflammation; and reference has already been made to nine other cases where the symptoms of shock might be, in measure, due to the loss of blood.

Two causes, both alike beyond the control of the practitioner, expose the patient to this shock: one, the sudden interruption of the labour; the other, the injury to the womb; and the feeble person, exhausted by previous disease and suffering, and therefore least able to bear up against their influence, is she whose case, in general, most urgently calls for the performance of this operation. The employment of opium in large and frequently repeated doses, as originally suggested by Dr. Stokes, in cases of peritonitis from perforation of the intestines, and of the successful adoption of which, in a case of rupture of the uterus, Dr. Mitchell has related[2] a very interesting example, would probably do something towards warding off the symptoms of collapse. The discontinuance of the opium, in the case just recorded, was probably injudicious; and the patient's brief rallying afterwards was, perhaps, due to its readministration. At the

[1] Neue Zeitschrift für Geburtskunde, Bd. ix, s. 212.

[2] Dublin Journal of Medical Science, Jan. 1843.

same time, the recovery of those patients who have survived the operation, does not seem to be attributable to the adoption of any one appropriate and well-considered plan of treatment; but their history is characterised by the very slight degree in which the shock was experienced, or the rapidity with which it spontaneously passed away; so that the fortunate issue of the operation appears to have been due to the vigour of the patient, rather than to the skill of the doctor.

In fifty-six out of the 147 cases, or in 37 per cent., the symptoms during life, and the appearances discovered after death, were those of inflammation of the peritoneum, or, in some cases, of the uterus, and, in not a few instances, the morbid processes are said to have issued in gangrene. In twenty-nine cases more, the consequences of inflammation were found after death, though its symptoms were more or less masked by those dependent on previous hæmorrhage, or on the shock of the operation. It certainly can be no cause of surprise, that in eighty-five out of 147 cases, or in 57 per cent., the evidences of peritoneal inflammation should have been present; for, in addition to all those influences peculiar to child-birth, which render peritoneal inflammation more frequent then than at any other time, there is superadded the extensive injury inflicted by the operation, the long exposure of the abdominal cavity, and the subsequent escape, in many instances, of blood, or of the uterine discharges into it. Moreover, in addition to all of these causes tending to produce serious inflammation of the peritoneum, there is the absolute necessity of the occurrence of some degree of inflammation for the closure of the wound, and the repair, in as far as nature can effect it, of the grievous injury which has been inflicted by the operation. How narrow must be the limits which, in a patient who has undergone the Cæsarean section, separate the healthy action essential to repair, from the morbid action that tends to destruction!

The state of the wound has, unfortunately, engaged less attention than the interest and importance of the inquiries

on which it bears, might well demand. Still, even from the imperfect data with which we are furnished, it seems clear that one of the first steps which nature takes towards the repair of the injury in these cases, consists almost invariably in the setting up of inflammation of the peritoneal surface of the uterus, and of the corresponding portion of the abdominal peritoneum, or, less often, of the peritoneal surface of the intestines; with the view of forming adhesions all round the wound of the uterus, and thus isolating it from the cavity of the abdomen. This being effected, adhesion takes place between the cut edges of the peritoneum; which, lymph effused upon its surface, strengthens, though this often takes place but slowly, and, for a long time, imperfectly; as, for instance, in a case related by Professor von Ritgen,[1] in which a fistulous communication between the surface of the body and the interior of the womb did not close till the sixty-fifth day. Afterwards the divided tissue of the uterus itself, in some instances, becomes united, though this last step always takes place most imperfectly, and sometimes not at all.

In many of the fatal cases it has been found that no step whatever has been taken towards repair; in more the process set up has been a perverted one, and there is no attempt at adhesion, but a dirty exudation covers the pale and bloodless peritoneum extensively, or is poured out in a fluid form into the abdominal cavity; while in others, as already mentioned, parts are found with their vitality destroyed, and this not by the excessive activity of powers which, moderated, might have conduced to repair, but by their deficiency.

And this brings me to the last cause of the high mortality which follows this operation, and a cause against which skill can avail absolutely nothing, since it is inseparable from those processes which nature sets on foot after the uterus is emptied of its contents, be the period of pregnancy, at which that takes place, what it may. In a large proportion of cases, the record of the examination after death states, that the wound of the uterus was found gaping widely, even many

[1] Neue Zeitschrift für Geburtskunde, Bd. ix, Heft 2.

days after the operation was performed. In other instances it is stated that the inner edges of the uterine wound were in contact, but the outer were far apart; and that, along the whole wounded surface, no indication was to be found of any attempt at its closure; while I know of but two instances in which the edges of the uterine wound are said to have presented a granulating surface.[1]

Tardy, however, though the union of the wound of the uterus is, it yet takes place eventually, if the patient survives; and the history of the subsequent pregnancies and labours of women who have undergone the Cæsarean section, proves that this union must, in some cases, have acquired a considerable degree of strength. The great majority of instances, however, in which women have survived the operation, illustrate, in spite of the incompleteness of their record, the serious difficulties in the way of a cure, and the imperfect manner in which it is almost invariably accomplished. The giving way of the uterus at the cicatrix of the operation in a subsequent pregnancy, and the escape of the ovum into the abdominal cavity, are occurrences with which all who are conversant with the history of the Cæsarean section are familiar.[2] Imperfect, too, as the accounts of the cicatrix are, in those cases in which death has occurred after the lapse of some months from the performance of the operation, they yet suffice to show the frail nature of this bond of union. The womb, indeed, is generally adherent to the abdominal walls, but its divided substance is almost always found ununited; the edges of the wound being closed merely by the union of the peritoneum. Even where the union has gone deeper, it has yet been effected only by means of a dense, quite unyielding, or but slightly elastic, cellular tissue; in some instances, of such low organisation as to have been found converted into a hard, almost bony, substance. How slow,

[1] Whitehead, 'Medical Gazette,' Sept. 1841; and Kranefuss in 'Rust's Magazin,' &c., Bd. xlv, p. 257, as quoted by Kayser, p. 87.

[2] Many of these cases are detailed by Professor Michaelis of Kiel, in his valuable essay on the Cæsarean Section. See his 'Abhandlungen aus dem Gebiete der Geburtshülfe;' Kiel, 1833.

too, the processes are by which, even under favorable circumstances, this cicatrix tissue becomes assimilated to the structure of the organ in which it is developed, can hardly be better shown than by the following account by Dr. Lange,[1] of the examination of the uterus of a woman who died of some chest affection nearly two years after the performance of the Cæsarean section.

"Just over the symphysis pubis there was a deep depressed cicatrix several lines in depth, and of the size of a sixpence. From the inner surface of the abdominal walls there was seen, continued from this cicatrix, a wedge-shaped prolongation, half an inch in length, as thick as the finger, of a round, but slightly flattened, shape, extending to the anterior wall of the uterus, and being closely united to it. In the interior of this band there was a cavity which communicated with that of the uterus, by an opening two lines in diameter. The interior of this conical cavity was lined by a prolongation into it of the uterine mucous membrane, and there seemed, moreover, to be a process of reproduction of uterine tissue in course of progress from the basis towards the apex of the cavity. Several bands of a callous substance, resembling that just described, ran from the sides of the larger cicatrix to the anterior wall of the uterus."

Dr. Lange remarks, concerning these appearances of which I have given an abridged description, that this sort of diverticulum proceeding from the uterus, indicates sufficiently clearly that the healing of the wound was not effected by union of its edges, but by the effusion of plastic lymph from the inflamed uterine peritoneum, and its cohesion with the inflamed abdominal peritoneum.

The surgeon who removes a limb in which gangrene has commenced, knows that, unless his incisions are made some distance above the decaying tissue, he can have no hope of the healing of the wound. The uterus, after delivery, is in

[1] In a paper at p. 126, vol. iv, of the 'Vierteljahrschrift für die gesammte Heilkunde,' for 1846, which contains by far the best account of the structure of the cicatrix in these cases ever yet published.

a condition, not certainly of decay, but, at least, of desintegration. Instead of there being any natural tendency to an increased afflux of blood towards it, that first step towards the repair of injury, the very discharge of its contents cuts off half the supplies of blood previously directed to it. From the weight of ʒxxiv, which the organ has been ascertained to have just after delivery, it is reduced, in the course of six weeks, to a weight not exceeding an ounce and a half. This change, too, is effected, not by simple absorption, but is attended also by a general degradation of its tissue, of which the abundant presence of fat globules in the lochial discharge, and in the *débris* which cover the interior of the organ, is ample evidence.[1] It is true, indeed, that, simultaneously with the removal of the old tissue, there goes on a formation of new; but of a tissue much more lowly organised, possessed of but small power to repair injury, and which commonly requires, for its higher development, the appropriate stimulus furnished to the uterus by pregnancy, and the sojourn of an ovum in its cavity.

The condition of the uterus in the patient whose history I have related, gave an apt illustration of the correctness of these views. The organ was generally pale and bloodless, the edges of the incision through it were swollen, infiltrated, œdematous, and discoloured by altered blood, so as to look, at first, almost as if gangrenous; and I have little doubt but that, in many of the cases in which the organ was alleged

[1] See Virchow's account of the microscopic examination of the uterus of a woman who died fourteen days after delivery, in the 'Verhandlungen der Gesellschaft für Geburtshülfe,' in Berlin, vol. iii, p. xvii; with which the brief account by Kölliker, in the 'Zeitschrift für Wissenschaftliche Zoologie,' vol. i, p. 73, perfectly harmonises. The elaborate essay of Professor Franz Kilian, in 'Henle und Pfeuffer's Zeitschrift,' vol. ix, p. 1, furnishes a more complete account than is elsewhere to be found, both of the development of the tissue of the uterus, and of the changes which take place in it after delivery; and demonstrates the fact of the removal of the old uterine tissue, and the production, in its place, of a new and more lowly organised tissue, to which reference is incidentally made by Mr. Rainey in his paper in the 'Philosophical Transactions' for 1850, part ii, pp. 519-20.

to have been in a state of gangrene,[1] that condition was, as in the above instance, apparent rather than real.

If, then, such and so many dangers beset this operation, if the recoveries from it be so few, and the mortality so great, while the causes of that mortality are, for the most part, beyond the power either of surgical dexterity or medical skill to obviate, and some of them inseparable from those processes which needs must follow delivery, we may, I think, feel satisfied that the general rule in British Midwifery, which prohibits the performance of the Cæsarean Section, except where delivery would otherwise be altogether impossible, rests on a far sounder foundation than that of mere prejudice, or blind obedience to the dicta of men eminent in their profession.

At the same time, these facts can yield no apology for those who, in cases calling for this operation, allow, from any cause whatever, the right moment to pass by unused. They rather leave such conduct altogether without excuse, since, by it, dangers always great are rendered insurmountable, and hopes, small at the best, are utterly destroyed.

[1] Many cases of an analogous condition of the uterus, in women who have undergone the Cæsarean section, might be adduced. The following may suffice from the history of a woman who died thirty days after the performance of the Cæsarean section. "The wound of the uterus was slightly closed at its lower part; but at its upper end, where it had been carried quite up to the fundus uteri, it not merely gaped widely, but the absorption of its edges had gone on with such activity, that nearly the whole of the fundus uteri was consumed."—Busch, 'Geburtshülfliche Abhandlungen,' 8vo, Marburg, 1826, p. 243. He attributes this condition of the uterus to the effects of the osteomalacia, which was still advancing at the time of the patient's death; but it may, I think, with more propriety, be referred to those causes mentioned in the text as acting on the uterus after delivery.

TABLE (*referred to at p. 75*),

Showing the Cause of Death, and the Date of its occurrence, in 147 Fatal Cases of the Cæsarean Section.

Date of death.	Hæmorrhage.		Shock to nervous system.		Inflammation.		Hæmorrhage and shock.		Hæmorrhage and inflammation.		Shock and inflammation.		Causes independent of operation.		Total.
	No. of cases.	Reference.	No. of cases.	Reference.	No. of cases.	Reference.	No. of cases.	Reference.	No. of cases.	Reference.	No. of cases.	Reference.	No. of cases.	Reference.	
Under 1 hour	1	1	1	15*	..	..	..	..	..	..	..	..	..	..	2
Between 1 and 2 . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
„ 2 „ 6 . .	2	2–3	1	15	1	47	2	101–2	..	..	..	..	..	..	6
„ 6 „ 12 . .	1	4	..	..	1	48	..	..	..	..	..	..	..	..	2
„ 12 „ 24 . .	4	5–8	7	16–22	1	49	2	102–4	..	..	..	..	..	..	14
„ 24 „ 36 . .	2	9–10	6	23–28	11	50–60	..	..	2	110–1	1	128	1	139	23
„ 36 „ 48 . .	1	11	5	29–33	7	61–67	..	..	3	112–4	3	129–31	..	..	19
„ 48 „ 72 . .	2	12–13	7	34–40	7	68–74	2	105–6	4	115–8	2	132–3	..	..	24
„ 72 „ 96 . .	..	..	4	41–44	10	75–82 80*–81*	1	107	2	119–20	1	134	..	..	18
On 5th day	1	14	1	45	5	83–87	2	108–9	4	121–4	3	135–7	..	..	16
„ 6th „	..	..	1	46	2	88–89	..	..	1	125	1	138	..	..	5
„ 7th „	..	..	..	..	1	90	..	..	..	..	..	..	1	140	2
„ 8th „	..	..	..	..	4	91–94	..	..	2	126–7	..	..	1	141	7
„ 9th „	..	..	..	..	2	95–96	..	..	..	..	..	..	1	142	3
„ 10th „	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Between 10th and 12th	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
„ 12th „ 15th	..	..	..	..	2	97–98	..	..	..	..	..	..	..	..	2
„ 15th „ 20th	..	..	..	..	1	99	..	..	..	..	..	..	..	..	1
Above 20	..	..	..	..	1	100	..	..	..	..	..	..	2	143–4	3
Total	14	..	33	..	56	..	9	..	18	..	11	..	6	..	147

References to the Cases enumerated in the foregoing Table.

1. Bell, Medico-Chirurgical Transactions, vol. iv . Kayser, p. 56. No. 71.
2. Thompson, Medical Records, &c. . . . —— p. 48. No. 37.
3. Wraith, Provincial Med. Journ., Jan. 21, 1843.
4. Engeltrum, Gemeinsame Deutsche. Zeitschr. f. Geburtsk., iv . . . . . —— p. 76. No. 145.
5. Ansiaux, Clinique Chirurg., p. 63 . . . —— p. 63. No. 100.
6. Baudelocque, Transact. Médicales; Septr. 1833. —— p. 86. No. 181.
7. Anonymous, at Vienna, Balfour, Northern Journ.; May 1846.
8. Hüter, Neue Zeitschr. f. Geburtsk; xxvii, p. 358.
9. Stein, Siebold's Journal; vol. xiii . . . —— p. 82. No. 162.
10. Lyon, Monthly Journ. of Med. Science, Dec. 1845.
11. Etlinger, Observationes Obstetricæ; 4to, Bonnæ, 1844.
12. Merrem, Gemeins, Deutsche Zeitschr. f. Geburtsk.; iii, p. 341 . . . . . —— p. 77. No. 147.
13. Johannknecht, Abhandl. d. ärztl. Gesellsch. z. Münster; 1829, p. 366 . . . . . —— p. 79. No. 155.
14. Kirchoffer, Neue Zeits. f. Geburtsk.; xix, p. 305
15. Hull, Defence of the Cæsarean Operation . . —— p. 54. No. 67.
15*. Shipman, American Journal of Medical Science; July, 1849.
16. Hull, Defence of the Cæsarean Operation . . —— p. 52. No. 61.
17. Hunold, Stein, Geburtshülfl. Abhandl. . . —— p. 56. No. 72.
18. Henderson, Edinb. Med. Surg. Journ.; xvii, p. 105 —— p. 67. No. 113.
19. Armbruster, Stein, Lehranstalt der Geburtsk., p. 184 —— p. 73. No. 182.
20. M'Kibbin, Edinb. Med. Surg. Journ.; xxxv, p. 352 —— p. 80. No. 158.
21. Thibault, Arch. Gén. de Médecine; June 1844 .
22. Montgomery, Dublin Journal; Jan. 1835 . . —— p. 87. No. 186.
23. Chalmers, Hamilton's Outlines of Midwifery; Edinb. 1806, p. 293 . . . . . —— p. 46. No. 40.
24. Cooper, Med. Observ. and Enquiries; v . . —— p. 46. No. 41.
25. Juppin, Journ. de Méd. Chirurgie, &c.; liv, p. 65 —— p. 49. No. 49.
26. Baudelocque, Recueil Périodique; v, p. 435 . . —— p. 55. No. 69.
27. Kottmann, Rheinische Jahrb. f. Med. u. Chir.; vi, pt. 2. . . . . —— p. 69. No. 119.
28. Legroux, Révue Méd.; iii, p. 353 . . . —— p. 78. No. 150.
29. Textor, Neue Zeits. f. Geburtsk.; v, p. 161 . . —— p. 88. No. 190.
30. Dohlhoff, Rust's Magazin, vol. lii . . . —— p. 91. No. 199.

31. Wolff, Neue Zeitschr. f. Geburtsk.; viii, p. 354 . Kayser, p. 92. No. 203.
32. D'Outrepont, ibid.; xiii, p. 431.
33. Etlinger, Observationes Obstetricæ; p. 49.
34. Klein, Loder's Journal; vol. ii . . . —— p. 55. No. 68.
35. Assalini, Michaelis, Abhandlungen; p. 87, obs. 17 —— p. 66. No. 108.
36. Busch, ibid.; p. 94, obs. 37 . . . . —— p. 73. No. 131.
37. Carus, Gem. Deuts. Zeits. f. Geburtsk.; ii, p. 406 —— p. 76. No. 143.
38. Gräfe, Berlin. Med. Zeitung; 1832, No. 16 . . —— p. 82. No. 163.
39. Moreau, Arch. Gén. de Méd.; Févr., 1838 . . —— p. 90. No. 197.
40. Cox, Provincial Med. Journ.; Sept. 18, 1844.
41. Deleurye, Obs. sur la Section Césarienne . . —— p. 48. No. 48.
42. Kluge, Siebold's Journal; viii, p. 72 . . —— p. 78. No. 149.
43. Emmert, Schmidt's Jahrb.; 1847, No. 8.
44. Grenser, Neue Zeits. f. Geburtsk.; xxv, p. 242.
45. Wiedemann, Siebold's Lucina; vol. i, pt. 3 . . —— p. 59. No. 82.
46. Serres, Baudelocque, Recueil, &c.; v, p. 428 . —— p. 57. No. 78.
47. Oesterlen, Michaelis, op. cit.; p. 90, obs. 27 . —— p. 67. No. 114.
48. Wood, Med.-Chir.-Trans.; vol. vii . . . —— p. 65. No. 107.
49. Kellie, Ed. Med. Surg. Journ.; vol. viii, p. 11 . —— p. 64. No. 102.
50. Stein, Annalen d. Geburtsk.; pt. 3 . . . —— p. 46. No. 42.
51. Wood, Memoirs of Med. Soc. of London; vol. v . —— p. 55. No. 70.
52. Hamilton, Outlines, &c. . . . . —— p. 53. No. 62.
53. Osiander, Comm. Soc. Reg. Med. Gott.; 1813 . —— p. 60. No. 87.
54. Decke, Rust's Magazin; vol. xvii . . . —— p. 71. No. 126.
55. Bongiovanni, Omodei Annali; April, 1825 . . —— p. 71. No. 127.
56. Michaelis, Pfaff's Mittheilungen; p. 111 . . —— p. 85. No. 170.
57. Jungmann, Oest. Med. Jahrb.; vol. xxv . . —— p. 90. No. 198.
58. Radford, Ed. Med. Surg. Journ.; vol. lv, p. 67.
59. Kömm, Oest. Med. Jahrb.; xviii . . . —— p. 93. No. 209.
60. Campbell, Med. Gazette; May, 1849.
61. Roederer, Siebold's Lucina; vol. iv, pt. 1 . . —— p. 44. No. 35.
62. Baudelocque, Lachapelle, Accouchemens; vol. iii, p. 506 . . . . . —— p. 63. No. 98.
63. Bongiovanni, Omodei Annali; vol. xxix . . —— p. 71. No. 125.
64. Ulsamer, Siebold's Journal; vol. x . . . —— p. 75. No. 141.
65. Gueury, Gaz. des Hôpitaux; 1840, No. 79 . . —— p. 87. No. 185.
66. Putegnat, Monthly Retrospect; Oct. 1848.
67. Balfour, Monthly Journal; Aug. 1847.
68. Seidler, Rust's Magazin; vol. xx . . . —— p. 72. No. 128.
69. De Beauclair, Gemeinsame Deuts. Zeits.; i, p. 115 —— p. 74. No. 134.
70. Anonymous, Kleinert's Repertorium: vol. iv . —— p. 77. No. 148.
71. Mancini, Osservationi Mediche; 1827, No. 10 . —— p. 78. No. 151.
72. Wendelstädt, Siebold's Lucina; iii, p. 345 . . —— p. 83. No. 166.
73. Flamin, Neue Zeits. f. Geburtsk.; vi, p. 400 . —— p. 89. No. 193.
74. Brooke, Am. Journal of Med. Science; May, 1836 —— p. 93. No. 206.
75. Roederer, Siebold's Lucina; iv, pt. i . . . —— p. 44. No. 36.

76. Kenckel, Michaelis Abhandl.; p. 76, obs. 19 . Kayser, p. 45. No. 38.
77. Stein, Geschichte d. Kaisergeb. . . . . —— p. 50. No. 54.
78. Osiander, Comm. Soc. Reg. Gott.; 1813 . . —— p. 61. No. 90.
79. Berger, Siebold's Journal; vol. v, p. 142 . . —— p. 68. No. 116.
80. Cornelis, Annales d. Méd. Belge; July, 1836 . —— p. 89. No. 101.
80.* Martini, Canstatt's Jahrb. f. Geb.; 1847, p. 327.
81. Dormann, ibid.; xx, p. 324.
81.* Hüter, Neue Zeitschr. f. Geb.; xxvii, p. 366.
82. Genth, ibid.; xxvii, p. 200.
83. Ohle, Salzb. Med. Chir. Zeitung, vol. 110 . . —— p. 59. No. 83.
84. Leydig, Gem. d. Zeitschr. f. Geburtsk.; vi, p. 328 —— p. 65. No. 105.
85. Rust, Siebold's Journal f. Geburtsk., vol. xiii . —— p. 70. No. 123.
86. Siebold, Neue Zeitschr. f. Geburtsk.; xviii, p. 45.
87. Busch, ibid.; xxviii, p. 207.
88. Bongiovanni, Omodei Annali, vol. xxix . . —— p. 70. No. 124.
89. Ward, Med. Gazette; vol. xxi . . . . —— p. 93. No. 208.
90. Neuber, Hufeland's Journal; lxxxiii, p. 52 . . —— p. 81. No. 159.
91. Dubois, Lachapelle, op. cit.; iii, p. 504 . . —— p. 72. No. 129.
92. Reuter, Heidelb., Clin. Annalen; x, p. 431 . . —— p. 81. No. 160
93. Coley, Case of Cæsarean Section.
94. Busch, Neue Zeits. f. Geburtsk.; xxviii, p. 207.
95. Schützer, Michaelis, op. cit., p. 76, obs. 14 . —— p. 43. No. 84.
96. Hoebeken, Bull. Med. Belge; Févr, 1838 . . —— p. 82. No. 169.
97. Kranefuss, Rust's Magazin; xlv, p. 257 . . —— p. 87. No. 187.
98. Hoebeken, Bull. Med. Belge; Jan. 1840 . . —— p. 92. No. 204.
99. Eck, Thom's Erfahrungen, &c. . . . . —— p. 54. No. 65.
100. Ficker, Salzb. Med. Chir. Zeit.; 1806 . . —— p. 59. No. 85.
101. Lovati, Gem. d. Zeitschr.; v. p. 137 . . . —— p. 79. No. 154.
102. Nimmo, Monthly Journal; Sept. 1850.
103. Kunsemüller, Neue Zeitschr., &c.; xii, p. 375.
104. Sannemann, Lancet; July 13, 1850.
105. Ritgen, Heidelb. Clin. Annalen; i, p. 263 . . —— p. 70. No. 122.
106. Martin, Duo Sectioni Cæsareæ Exempla; 4to, Jenæ, 1850. . .
107. Barlow, London Med. Surg. Journal; iv, No. 96 . —— p. 77. No. 146.
108. Busch, Neue Zeitschr., &c.; v, p. 170 . . —— p. 81. No. 161.
109. The Author.
110. Ritgen, Gem. d. Zeitschr. f. Geburtsk.; v. p. 577 . —— p. 80. No. 156.
111. Skey, Lancet; Feb. 6, 1847.
112. Schlegel, Michaelis; op. cit., p. 89, obs. 24 . . —— p. 65. No. 106.
113. Fritz, Oest. Med. Jahrb., vol. xix . . . —— p. 91. No. 201.
114. Dubois, Archives Gén. de Méd.; May, 1839 . —— p. 92. No. 205.
115. Servaes, Siebold's Journal; vol. ii . . . —— p. 60. No. 88.
116. Baudelocque, Lachapelle; op. cit., vol. iii . . —— p. 62. No. 95.
117. Heune, Siebold's Journal, vol. vii . . . —— p. 73. No. 133.
118. Busch, Gem. d. Zeitschr. f. Geburtsk.; iii, p. 292 —— p. 78. No. 152.

119. Ferrario, ibid.; v, p. 140 . . . . . Kayser, p. 79. No. 153.
120. Haase, Neue Zeitschr., &c., iii, p. 407 . . . —— p. 85. No. 180.
121. Weissenhorn, De Partu Cesareo . . . . —— p. 52. No. 60.
122. Coutouly, Recueil Period. de la Soc. de Méd.; xxxiv, p. 277 . . . . . —— p. 53. No. 63.
123. Kilian, Gem. d. Zeitschr. f. Geburtsk.; vi, p. 324. —— p. 80. No. 157.
124. Busch, Med. Zeitung, 1840, No. 1 . . . —— p. 91. No. 202.
125. Michaelis, Siebold's Lucina, vol. v . . . —— p. 60. No. 89.
126. Siebold, Weidmann, Compar. inter Sectionem, &c. —— p. 47. No. 47.
127. Siebold, Siebold's Journal, vol. i, p. 279 . . —— p. 63. No. 101.
128. Meyer, ibid.; v, p. 105 . . . . . —— p. 75. No. 140.
129. Mursinna, Journal f. die Chirurgie, &c.; ii, p. 247 —— p. 58. No. 81.
130. Hooper, Lancet; Feb. 4, 1843.
131. Oldham, Med. Gazette; Feb. 21, 1851.
132. Stein, Praktische Abhandl. ü. d. Kaiserg. . . —— p. 47. No. 43.
133. Atkinson, On Division of the Symphysis . . —— p. 47. No. 46.
134. Haas, Geschichte eines Kaiserschnittes . . —— p. 51. No. 58.
135. Lauverjat, Neue Methode, &c. . . . . —— p. 49. No. 51.
136. Häsner, Siebold's Lucina; vol. vi . . . —— p. 61. No. 92.
137. Béclard, Lachapelle; op. cit., iii . . . —— p. 69. No. 118.
138. Dormann, Neue Zeitschr., &c.; xx, p. 324.
139. Dubois, Lachapelle; op. cit., iii, p. 495 . . —— p. 83. No. 168.
140. D'Outrepont, Salzb. Med. Chir. Zeit.; 1822, v. iv —— p. 68. No. 117.
141. Anonymous, Osiander, Entbindungsk.; vol. ii, pt. 2 —— p. 62. No. 96.
142. Schmidt, Siebold's Journal, viii, p. 257 . . —— p. 75. No. 139.
143. Busch, Michaelis; op. cit., p. 95, obs. 38 . . —— p. 72. No. 130.
144. Stoltz, Medicinische Annalen, vol. v . . . —— p. 91. No. 200.

A

CASE OF CÆSAREAN SECTION.

BY

DR. OLDHAM,

OBSTETRIC PHYSICIAN AND LECTURER ON MIDWIFERY, ETC., AT GUY'S HOSPITAL.

Received January 14th.—Read February 11th, 1851.

SARAH —, æt. 23, engaged at waistcoat-making in Bethnal Green, was born a feeble child, and during childhood was weak and rickety. The mother states that she was 7 years old before she could put her feet to the ground, and 13 years of age before she could walk securely. At 16 she first began to menstruate, and has continued to do so with tolerable regularity ever since, and her general health has been fairly good. She is now four feet eight inches in height, walks lame, and her legs are curved, so that she retains a deformed and dwarfish appearance. Her face and features are small, and her countenance is that of a girl of 14 or 15 years of age, and her circulation habitually rapid.

She applied to me for advice in the middle of September, 1850, complaining of amenorrhœa, of seven months' standing, the result, as she declared, of cold, for which she had ineffectually taken various medicines. At this time the abdomen was prominently large, and by auscultation the beats of the fœtal heart and uterine murmur were readily detected. She denied, at this time, the possibility of pregnancy, but subsequently she admitted that she had had sexual intercourse on two occasions, but she was in so much alarm at the time that she thought it impossible that she could have become pregnant. The lower lumbar vertebræ and the sacrum were observed to be deeply curved, and the

uterus was anteverted in a marked degree. On examination, the orifice of the vagina was found to retain much of the virgin contraction, from an imperfect laceration of the hymen; the canal itself was narrow and very tender, so that she shrunk from the necessary exploration. The projection of the promontory of the sacrum was so great as to shorten the conjugate diameter to about two inches; but the pelvic cavity and outlet were comparatively roomy. She was advised without loss of time to obtain a room near Guy's Hospital, and to be entered as a patient of the Lying-in Charity.

Sept. 23, 1850. This morning I determined to induce labour by puncturing the membranes, the bowels having previously been relieved by castor-oil. For this purpose a long slightly-curved canula, with a sharp-pointed stilette, which could be withdrawn at will from the canula, was employed. Some difficulty was experienced in reaching the os-uteri, as the patient lay on her side, on account of the height at which it was placed, the extreme tenderness of her soft structures, and her inability to flex her thighs well, which was caused by the prominence of the anteverted uterus. She was therefore placed on her back, and the canula having entered the amnial sac, about eight ounces of clear liquor amnii were drawn off. At this time the fœtal head could be felt, distinctly marked out on the abdomen above the pubes.

24th. This morning the bowels had been again relieved by aperient medicine, and some uneasiness about the uterus had been felt. Mr. Davies, who had charge of the case, examined and found the left arm in the vagina. On visiting her, I found that the child was still alive, and that touching the palm of the hand in the vagina, excited reflex muscular movement. The os uteri surrounded the arm, and the uterus was quiescent. The patient was ordered to keep quiet, and it was requested that no further vaginal examination should be made.

25th. She had not slept well on account of some irregular diffused uterine pain. The arm and os uteri were in the same

condition. She had passed urine freely, and during the day was tolerably free from pain. Her pulse is rapid, 93 in the minute, which is natural to her; but there are no febrile symptoms, and she is in good spirits.

26th. Early this morning ʒvj of castor-oil were given, which acted freely on the bowels in the course of the morning. At 9 a.m., some regular uterine pains commenced; and when I saw her the os uteri was found to be dilating well, and the vagina softer and less tender. The skin of the fœtal arm was peeling off.

Vaginal examination was forbidden.

At half-past 9 p.m., the os uteri was fully dilated, but the loose soft margin of it could still be felt, on account of the fœtal head being so held above the brim as not to have any bearing upon it. Some efforts at delivery were now made, the rectum and bladder being both empty.

A full exploration of the pelvic brim and the presenting part was made by the cautious introduction of the fingers of the left hand, with a view, if practicable, of running them beyond the brim, and catching and bringing down a foot; the right hand at the same time pressing the uterus from the abdomen, and doubling down towards the pelvic inlet the lower limbs of the fœtus, in a direction to meet the hand in the vagina. The patient was at this time on her back, but the pelvic brim was so contracted that it was soon obvious that any hope of delivery in this way must be abandoned. Traction was then made on the protruding arm, which shortly gave way at the elbow-joint; but the efforts of traction were found to have some effect upon the head, in moving it from above the pubes to the brim, which was aided by external pressure, directing it from the one part to the other. After the arm had separated, the head was so far within reach that the perforator could be made to touch it, and it was opened without difficulty. After the brain had been emptied, and, under the influence of regular and powerful uterine action, the bones of the head had shrunk together, repeated efforts were made with the crotchet, applied within the skull and outside of it, to draw the head through the

brim. In doing this the cranial bones and a part of the base of the skull were torn up, but without making any material way through the contracted brim. In the course of this operation, which was occasionally suspended for ten minutes to rest and refresh the patient, the right side of the pelvis was found to have squeezed into it the right hand and foot, both of which could be distinctly felt in this situation. A hope was now entertained that one or other of these limbs would double deeper into the pelvis, so as to be caught and drawn down, and attempts were made to accomplish this, but ineffectually. No hold could be got of either the foot or hand beyond the slippery tips of each, and labour-pains did not press them lower. A polypus canula and ligature were sent for, but the noose could not be passed over the ankle or wrist, and consequently there was no purchase for it. With the narrow brim of the pelvis thus packed by this complex presentation, the different parts of which mutually obstructed the process of each other's descent, and judging from the difficulties already experienced on attempting delivery—of the far greater ones which must be encountered in order to complete it—it became a question whether delivery should not be effected by the Cæsarean section. After a consideration of the case, I determined in favour of it, but before undertaking it, a consultation was held with my colleague, Dr. Lever, who having examined the patient, acquiesced in this decision, and without further delay preparations were made for performing it.

The room was heated by a good fire until the temperature was sensibly warm, some candles were obtained from the Hospital, and the Assistant-surgeon of the Hospital, Mr. Poland who operated, with the Resident Obstetric Clerks, soon arrived. The bladder was emptied by a catheter. The patient was placed completely under the influence of chloroform, and one gentleman had charge of the chloroform, and kept her during the operation under its power. The patient was drawn to the right side of the bed, the shoulders were slightly raised, and the best arrangements were made to let her maintain, without moving, the same position after the

operation. One assistant was directed to close the abdomen as the uterus contracted on being emptied, and the act of delivery was undertaken by myself. An incision beginning about two inches above the umbilicus, and carried down to five inches below it, so as nearly to reach the pubes, was made in the course of the linea alba, just missing the umbilicus itself. No bleeding of consequence followed this incision, and the uterus was soon exposed. On opening the abdominal cavity, some three or four ounces of transparent straw-coloured fluid ran out, and were caught by a sponge. The body of the uterus was seen to contract in a perfectly even way, on thus being laid bare, and to form a hardened compact body, its surface having its natural polish, and neither the large veins nor smaller capillaries being strikingly injected. The omentum glided easily between the fundus uteri and the abdominal wall, with a descent of about two inches. The uterine wall was then cut through, and the direction of the incision was slightly curved, the convexity looking to the right side. The length of the opening was about five inches, and the incision was made to reach the lowest part of the uterus near the cervix, so as to open the womb from below. But little blood was lost. I then passed my right hand into the cavity, and withdrew a full sized seven months' fœtus, by laying hold of its thigh. The uterus immediately contracted, and the intestines appeared at the upper part of the abdominal opening, which was promptly closed. The hand was again introduced between the membranes and the surface of the uterus, and with but little delay the placenta and membranes were removed, the former being attached to the upper part of the posterior wall. The uterus then contracted, and in doing so the convex border of the incised wall was seen to wrinkle, and not to adapt itself to the corresponding surface. Some venous bleeding took place, but to no great amount. A sponge wrung out of warm water was now gently drawn over that portion of the convex border of the intestines and omentum which had protruded and been smeared with blood, and the upper part of the external opening was at once closed by the application of sutures. Whilst this was

being done by Mr. Poland, I held a sponge over the edges of the uterine opening, gently pressing them together, and by the time that the wound was closed above, all bleeding had ceased, and the two surfaces were evenly adapted, and were seen to be quite free from any interposed structure. Other sutures, eleven in all, were then applied; some broad strips of plaster were drawn across the abdomen, and two cushions of lint were placed vertically on the sides of the central incision, and a binder cut out into tails was adjusted over the whole. During the operation the patient was quiet, excepting when the uterus was at its height of contraction, when she wriggled about slightly, but hardly enough to incommode Mr. Poland. The pulse was of good strength, and she was left reclining on her back, and sleeping in a tranquil manner under the influence of chloroform.

At a quarter to four, a.m., three quarters of an hour after the operation, she opened her eyes as though waking from a natural sleep, and she then told me that she had known nothing of the operation, and felt quite comfortable. Just before this her pulse was 118 in the minute, and the respiration 32.

During the remainder of the night she took ʒij of laudanum; at first, ʒj was given her soon after she awoke, half an hour after which she began to shiver; the pulse became rapid and weak; the respiration quickened and catching; the extremities cold; and she complained urgently of an oppressive tightness over the upper part of the abdomen. A small quantity of hot brandy-and-water was given her, and ʒss of laudanum, and some warm clothes were tucked around her. The bandage was loosened at its upper part, which gave her some relief. In an hour's time she was in a profuse sweat, and felt easy, but was indisposed to sleep. The remaining ʒss of laudanum was then given, and towards morning she had some sleep.

First day.—In the morning she expressed herself as feeling comfortable, and free from pain. She breathes easily, and the skin is freely perspiring. Pulse 130; tongue moist, slightly furred. The upper part of the abdomen, above the

bandage, is distended with flatus, so as to bulge up above the edge of the bandage. ℥vj of dark-coloured urine were drawn off by the catheter. The pupils are contracted, evidently from the effects of opium, and she is in a quiet dozy state, readily, however, answering questions, and quite free from restlessness.

Great care was taken to keep her undisturbed, and she was ordered cold drinks of spring- or toast-water, or tea. In the course of the day she was ordered—Julepium Ammon. Acet. c. Mist. Camph. et Tinct. Hyoscyam. ℥ss, 4^{tis} horis, but of this she took only two doses.

In the evening.—She had passed the day in a perfectly tranquil manner, sleeping a good deal. She had taken freely of the cold liquids from time to time, and there was but little alteration in her general state, which was as favorable as could be expected. Between six and seven ounces of clear urine were drawn off. She had sweated profusely at intervals during the day, requiring the clothes to be lightened, and now the skin is warm and moist. There is no abdominal tenderness.

The vulva was sponged with warm water; warm napkins were applied, and the sheets were shifted from under her with as little movement as possible. There was a moderate dark-coloured lochial discharge.—Calomel, gr. j, Pulv. Opii, gr. ij, in formâ Pilul. Statim sumenda.

Another pill was ordered to be given, at the discretion of the resident obstetric clerk who sat up with her, if the first should fail to procure rest.

Second day.—The second pill was given at 2 a.m., and she passed a tolerably quiet night. Towards morning she complained of a sharp shooting pain below the edge of the false ribs on the right side, with short, free intermissions. Pain also was felt in the uterine region, and the abdomen was more tympanitic. She had passed urine of her own accord during the night. Pulse 150, small; respiration more rapid; mind clear. The pain in the side increased towards noon, and the breathing was more embarrassed.

Some cloths wrung out of hot water were applied to the

side. Another two grains of opium were given, and the vulva again sponged; she had partaken freely of barley- and toast-water, and tea; on one occasion she had vomited, but without effort. In the afternoon her breathing became catching, and more frequent; her pulse more rapid and feeble, and evidence of vital exhaustion was apparent. She died in the evening.

From the time of her delivery to her death, this patient was watched, without intermission, by Mr. Davies and the resident obstetric clerks.

Post-mortem examination.—Thirty-six hours after death an inspection of the abdomen was made by myself with Messrs. Stocker and Morgan, the obstetric assistants. The upper region of the abdomen, above the bandages, was distended by flatus; but the middle and lower parts, which had been covered by plaster, were comparatively flat. On removing the bandage and plaster, the edges of the external wound were seen closely approximated; and on cutting through the sutures, the process of adhesion was found to have made some advance, so that it needed some little traction, beyond the weight of the neighbouring tissues, to reopen the incision. On exposing the abdominal cavity, a few coils of the small intestines, near the uterus, were seen not much injected, but with some films of recent lymph between them, and some serous fluid tinged with blood, and intermixed with flakes of lymph. But the degree of peritonitis was not great, and it did not extend to the upper part of the abdomen. The bowels were distended with gas, but their solid contents were trifling. The omentum was much thickened and indurated, and its blood-vessels were filled with blood. It sunk upon the fundus uteri, and there, being comparatively fixed, it formed a barrier, which prevented the blood from the open uterus running into the peritoneal cavity. The uterus occupied its normal position after delivery; rather inclined to the left, and well-reduced in size. The length of the incision was reduced to three inches, and its curved outline more distinct than when made during the operation.

The edges, for almost the entire length, were separated, leaving a gap of a half to three fourths of an inch in width, when measured from the outer surface. The edges, towards the inner surface of the uterus, were nearer together, but still apart, and some lochial discharge ran out through the opening, which, during life, had apparently been retained within the limits of the uterus by the close fitting in of the abdominal walls with the pressure of lint and strapping, and the upper wall of indurated omentum. The length of the uterus was nine inches and a quarter, and if a line were drawn half an inch transversely above the centre, the incision would be contained in the lower part. The peritoneal surface of the uterus was more opaque than natural, with here and there some shreds of recent lymph; but there was but little vascular injection. The muscular structure of the uterus, and the veins were not inflamed or thickened, excepting at the margin of the opening, where the tissue felt more dense and crisper than usual. The os uteri was uninjured. A corpus luteum was in the right ovary. The pelvis, which I was fortunate enough to procure, is altogether *small*, all its diameters being below the standard measurement, excepting at the outlet, which is sufficiently spacious. The principal deformity is in the conjugate diameter of the brim, on account of the promontory of the sacrum jutting forward with an inclination to the *right* side. It measures two inches. From the promontory to the *right* pectineal eminence there is a space of two inches, but to the *left* pectineal eminence, there is two inches and an eighth. The transverse measurement is four inches and three fourths, and the oblique, four inches. The diameters of the cavity, although contracted, are not so reduced as to cause any serious obstacle, in a practical point of view, to the removal of a child.

Remarks.—There were two practical questions suggested by this case:—1. What was the best plan to attempt to follow out in the delivery at first? 2. Were the complications such as, under the circumstances, to justify the Cæsarean section?

1. When first I saw this young woman, she was already seven months advanced in pregnancy, and my conviction, after a vaginal examination, was that there were, as nearly as possible, two inches in the conjugate diameter, which was *the* particular solid obstruction to be considered in the delivery.

The two methods of treatment which might be adopted, were—(1) to induce premature labour, and deliver by craniotomy, and (2) to allow her to go to term, and then perform the Cæsarean section. By inducing premature labour, although at the age of viability, there was no expectation of saving the child, but only that, by removing a body of relatively small dimensions, the operation by the crotchet would be facilitated. The important favorable circumstance in this mode of delivery was, that it afforded, in my judgment, a reasonable expectation of being completed through the birth-passages by an operation, from which the mother might escape with impunity, although at the sacrifice of the child. In favour of the Cæsarean section, there was the probable preservation of the child, and the somewhat diminished risk from so formidable an operation, by a careful preparation of the patient for it—undertaking it at a selected moment, and such attention to points of practice, during and after it, as have lately been found of service in abdominal surgery. This mode of delivery would, I believe, have found favour in the eyes of some obstetric practitioners, with whom the expectation of saving the child's life would have outweighed the degree of operative danger to which the mother would be exposed. My own judgment was clearly in concurrence with the practice which was adopted. Had the pelvic deformity been greater, and pregnancy, as in this case, been concealed until the seventh month, preventing, therefore, an early induction of labour, there could have been no hesitation in having recourse to the Cæsarean section. But with a conjugate diameter of two inches, and a sufficiently spacious cavity and outlet, there was so fair a likelihood of delivering by the crotchet, that I should have felt culpable in not undertaking it. In the election between the safety of

the child, and an augmented danger to the mother from a serious surgical operation, I was not disposed, in this case, to tamper with the maxim which happily prevails with obstetric practitioners in England in favour of the mother. And although the results of this case, when separated from these and after-considerations, and appearing nakedly as in a statistical table, are most gloomy and disappointing, and delivery by the Cæsarean section, at first, might have rescued the child, and offered a better chance for the mother, yet I should not, in a similar case, feel justified in deviating from the same practice. My conviction is, that the mal-position of the child, which was, of course, unexpected, and beyond control, so augmented the difficulties of the first hinderance, as to thwart my purpose.

With reference to the second question, it will be noticed, that twelve hours were suffered to elapse to allow the first stage of labour to be well completed, and to favour the physiological softening of the vagina and external organs. In introducing my hand, with the view of learning more accurately the degree of deformity of the pelvis, I had the remote expectation that I might probably seize, with the fingers, a lower extremity, by the same kind of manipulation which Dr. Lee has practised successfully in some cases of unavoidable hæmorrhage, with a rigid undilated os uteri. Failing in this, the prolapsed arm was, with the aid of external pressure, made the means, by traction on it, of bringing the head over the brim, which allowed of its being opened, reduced, and drawn upon, until I hoped to get it through the brim. It was in a pause of this operation that, on sweeping the inlet of the pelvis with the finger, I found that a foot had descended by the side of the hand, and had been squeezed into the right side of the pelvis by the action of the uterus. On watching the effect of some labour-pains, I found that the force of the contractions was spent, not in pressing one part below the other, but in wedging them altogether in the narrow brim. It was obvious that, if either extremity could be dislodged from the brim and brought down, it might be made of great service in helping

delivery; but all attempts to accomplish this manœuvre failed, as no sufficient hold could be got of them. With this new source of difficulty, what was best to be done? It appeared to me that one of two courses might be followed. The first was to persevere in removing the mutilated fœtus through the vagina; and the second, to deliver by the Cæsarian section. I felt, too, that it was imperative to decide between them *at once*, as the effect of every half-hour's delay, especially if employed in further efforts at extraction, would increase the danger of the Cæsarean section, and, indeed, if long persevered in, would compromise all chance of its success. The patient at this time manifested no signs of exhaustion, the pulse, though rapid, was of good volume; her spirits were fairly good; the abdomen was free from tenderness, and the sexual passages were not inflamed. The principal reason which induced me to prefer the Cæsarean section was, that I feared the patient would not sustain such prolonged efforts at delivery as would have been necessary, and that she might die exhausted before or soon after delivery. The girl had but a feeble constitution, although her health had not, of late years, been bad; and I had no confidence in its enduring against this hard trial of its powers. From the efforts I had already made, and from some experience in severe cases of craniotomy, I was quite sure that it would be a tedious and most difficult task, although aided by a fast advancing putrefaction of the fœtus, to effect delivery; and that even the life of a strong woman would have been placed in peril by it. I could not but call to mind a case which occurred in the Lying-in Charity of Guy's, in October, 1835, at which I was present. The patient, aged 32, was in labour with her sixth child, and the right hand and arm descended at the commencement of labour. An effort was made to turn by the student in attendance, but ineffectually. She was bled to ʒxvj, and took 100 drops of laudanum, when another attempt at version was made by the assistant-accoucheur, which also failed. The pelvis was found to be contracted in all its diameters, and the conjugate diameter measured two inches ten lines.

Eight hours from the first attempt at delivery, she was removed from her lodgings to a ward prepared for her in the hospital, and Dr. Ashwell then took charge of the case. She had already had a rigor; the pulse was rapid, and the abdomen tender. Without trying again to turn, Dr. Ashwell made attempts to remove the child by the cutting hook; but it could not be fixed upon the neck to sever the head from the trunk. The thorax was perforated; but after the most strenuous efforts, perseveringly followed out for many hours, it was obliged to be abandoned as hopeless, and the woman died undelivered. The pelvis is now upon the table. "If this case could again occur," says Dr. Ashwell, (*vide* 'Guy's Hospital Reports,' Vol. I,) "at the full period, and the knowledge now attained were possessed, there would, I think, be little hesitation as to the propriety of the Cæsarean section."

Another unfavorable circumstance in this case, in reference to persisting with the crotchet, was the state of the vagina. This canal has been noticed as retaining the structure of early age. It was closely ribbed throughout, very vascular, with a thin epithelial covering, and a feeling imparted to the finger of its being structurally weak and easily lacerable. This was remarked to those around me at the beginning, as a source of danger in a prolonged craniotomy case; and, excepting when the hand was introduced which lacerated the fourchette, this canal was very carefully guarded when the crotchet was being used. Should the patient survive the immediate dangers of delivery, I could not help feeling that there was a great risk of vaginal sloughing, with its revolting consequences.

On the other hand, the Cæsarean section offered a speedy and sure, instead of a prolonged and doubtful delivery, it was not yet forbidden from exhaustion or any signs of inflammation; on the score of suffering, it contrasted most favorably with the other practice, and I thought, upon the whole, that the chance of ultimate success from it was greater.

There is but little need of comment on the operation

itself, beyond the detail which has been given of it. It was performed much in the usual way without difficulty, and with nothing untoward. The incision was made as low down in the front wall as possible, and the slight curve in its direction was suggested by me, with the hope of catching the outline of the muscular fibres of the inner surface of the uterus, and so far favouring the closure of the wound within. It certainly failed to do so, and I do not know that there was any advantage over the straight incision.

The little hæmorrhage which attended the operation, and which did not delay the closure of the external wound, was, in great measure, due, I conclude, to the uterus being at the seventh month of gestation instead of the ninth, to the placenta being attached to the posterior wall, and to the incision being low down in the uterus, where the veins would be less developed.

The influence of the chloroform appeared to me to be a gain in every way.

It will be seen that the after-treatment by opium was steadily followed out, and the repetition of the doses was only suspended when the patient appeared at the time to be under its influence. The extent of reparation of the external wound, and the admirable manner in which the structures were laid out, to limit the mischief from the open wound in the uterus, and prevent its extravasated contents being diffused in the abdominal cavity, are worthy of attention, and must have been greatly favoured by the perfect tranquillity of the patient under the influence of opium.

CASE OF

EXTENSIVE NECROSIS

OF

THE BONES OF THE CRANIUM

AND

REMOVAL OF LARGE PORTIONS THEREOF.

BY

JOHN DRUMMOND, F.R.M.C.S.

DEPUTY INSPECTOR OF HOSPITALS,

MELVILLE NAVAL HOSPITAL, CHATHAM.

Received January 14th.—Read March 25th, 1851.

THE subject of the following narrative exhibits a greater extent of disease, affecting the Bones of the Cranium, (without in any way producing injury to the general health or cerebral functions of the patient,) perhaps, than any case on record, and as such may be deemed worthy of notice.

Thomas Blackman, in 1845, was a sailor, serving on board H.M.S. "Mutine," at Sierra Leone, when, from falling down a flight of stone steps, he received a contused wound of the scalp, covering the left side of the occipital bone. The bone was not supposed to have been injured at the time.

In October, 1845, we find him a patient in the Royal Naval Hospital, Plymouth; when the bone was, for the first time, found denuded of its pericranium to a considerable extent. Shortly after this he suffered from an attack of erysipelatous inflammation, involving the whole of the head

and face, leaving numerous purulent deposits under various parts of the scalp. The process of necrosis became more evident, and at different points matter was observed oozing from beneath the diseased bones; and when they had separated from each other at the coronal and sagittal sutures, the pulsations of the brain were distinctly visible.

In July, 1846, he was removed to Melville Hospital, Chatham.

It is scarcely necessary to trace the progress of the disease during a period of six years; further than to remark that his chief suffering arose from repeated attacks of erysipelas; often accompanied by much febrile excitement. His general health, however, at no time appeared much impaired, but, as a prophylactic against the effects of long protracted irritation and profuse suppuration, it was deemed expedient to afford a generous diet, with a moderate allowance of wine or malt liquor.

It was observed, that as the process either of *Caries* or *Necrosis* (for they were coexistent) advanced, the disease attacked, at some points, both tables of the bone simultaneously, while at others the external alone suffered. In the former case, the bones separated from the dura mater in large portions, while, on the other hand, when the external table alone suffered, it separated more slowly in smaller portions, and came more distinctly under the term Caries.

The disease still continues in the remaining portions of the cranium, and I may here observe, that at no point does there appear the slightest tendency to ossific reproduction.

On taking a general view of the head, the integuments are observed to have receded from their natural position, and to form several irregular masses, and Nature has provided the denuded *fibrous membrane* (by the deposition of lymph and by cicatrisation) with a delicate and highly vascular integument, through which the pulsations of the cerebrum are distinctly visible. On minute examination of the head, the following portions of bone are found to have been removed:—Of

the right side of the frontal, parietal, and squamous part of the temporal bones, about five square inches; the whole of the occipital, to within a short space of the foramen magnum, is deficient, save a portion of the centre, of about two square inches, which is detached, and moveable; this is in process of being thrown off. A large portion of the left side of the frontal, parietal, and temporal bones, remains at present firm, but in a diseased state, as is evident from numerous openings, discharging pus of a fetid nature, through which the bones can be felt, in a state of *caries*. A portion of the posterior part of each pariétal bone exists, as a slender arch over the vertex.

It is scarcely to be expected that this patient will be so fortunate as to resist the effects of complete destruction of the whole of the bones of the skull, which, if he live, must sooner or later take place. At present he is in robust health, suffering but little inconvenience from the extent of the disease. He continues a patient in this Hospital.

Two very accurate casts of the case, in wax, have been taken, one of which has been deposited in Haslar Hospital, and the other in Fort Pitt, Chatham, and which are well worthy the notice of any pathologist visiting these establishments.

AN ACCOUNT OF A CASE OF

FRACTURE AND DISTORTION

OF

THE PELVIS,

COMBINED WITH

AN UNUSUAL FORM OF DISLOCATION OF THE FEMUR.

BY

CHARLES HEWITT MOORE,

SURGEON TO THE MIDDLESEX HOSPITAL.

Received January 24th.—Read March 25th, 1851.

THE subject of Deformities of the Pelvis is one which has met with very full and satisfactory investigation. The causes from which they arise, and the mode in which each cause produces its proper consequent deformity, have been so well ascertained, that it can be at once determined by some salient characters whether any particular specimen be an instance of congenital malformation, or of deformity from disease, or from injury. When, for instance, one of the lateral masses of the sacrum is wanting, and its central portion is articulated, or rather anchylosed, with the adjoining ilium, we can clearly trace in that congenital fault in the formation of the sacrum, the cause of the approximation of one acetabulum to the promontory, and of the whole os innominatum to the mesial line, as well as of the straightening of the ilio-pectineal line, the altered axis, the diminished capacity, and all the other one-sided distortions of Nägele's oblique pelvis. The deformity in cases of fracture of the pelvic bones, is usually limited to that occasioned by the displacement of the fragments and the presence of the reparative callus. That remarkable compression of the pelvis, which is sometimes so extreme that the promontory of the sacrum and the base of the acetabulum coalesce, points clearly, through the softening of the bones,

to Rickets or Mollities ossium as its cause. Particular deformities, again, can be traced to causes extraneous to the pelvis itself; sometimes to the extremities below the pelvis, sometimes to the spine above it; and in the latter instance it is interesting to observe the constancy of the relation between particular deformities of the pelvis and particular curvatures of the spine,—a relation that is maintained whether the cause be a curvature of the spine which leads to the distortion of the pelvis, or the deformity commence with the pelvis and extend subsequently to the spine.[1]

Examples are exceedingly rare, however, in which more than one cause of deformity exists in the same pelvis; and there is, I believe, no instance in which so many of the principles of deformity are illustrated as in the accompanying specimen. By these reasons, as well as by the extensive nature of the injuries it has sustained, I am induced to lay an account of it before the Society. For the opportunity of doing so I have the pleasure of expressing my obligation to Dr. Seth Thompson.

James Thomas Horsfield, a stone-sawyer, was crushed beneath a heavy piece of timber several years before death. At the age of 60 he died in the Middlesex Hospital, under the care of Dr. Seth Thompson, of advanced disease of his heart and kidneys; and the following circumstances were noticed at the post-mortem examination, which add to the interest of the disease in his pelvis. For some of these particulars I am indebted to the careful and accurate observation of Mr. Sibley, a pupil of the Hospital, who was present at the examination.

The skull was in few parts less than half an inch in thickness. The processes at its base were blunted, and the crista galli projected upward as a great knob of bone. In the section presented to the Society, the enlargement is seen to be due to the expansion of the whole bone, which, notwithstanding irregular increase in the bulk of the separated fibres

[1] Rokitansky.

and laminæ, remains altogether porous, and presents no distinction of compact and diploetic structure. The outer surface is comparatively smooth, though it is unusually porous; the inner is roughened by the deposition of uneven masses of bone upon it, and by the consequent increase in the depth of the grooves for vessels.

The vertebræ were rough and porous; and a few exostoses projected from the margins of their bodies. On making a horizontal section of the intervertebral substances, the concentric circles were seen to be composed of calcareous matter and soft cartilage alternating.

The pelvis and adjoining bones exceed their natural weight by about one half. Like the skull, they are thick and coarse; their processes are bulky, and their crests blunted. The upper part of the left femur is thickened by the deposition of new bone upon its exterior. The right femur was comparatively healthy.

Moreover, extensive disease was discovered in the arterial system. The aortic and other cardiac valves were calcified; and the aorta, from the heart to its bifurcation, was covered with patches of calcareous deposit. The internal carotid and the basilar arteries were the most diseased; they were so brittle as to break down under the finger.

The pelvis is broken into several fragments; and in such a manner that its anterior portion is completely separated from the posterior. The fracture on the left side passes through the acetabulum, that on the right side just in front of it; and the ischio-pubal ramus is broken on both sides.

On the *left* side the innominatum is broken into three fragments, which correspond almost precisely with the segments of which the bone is composed in early life. For the lines of fracture, as they traverse the acetabulum, divide it in the proportions of rather more than two fifths, which are severed with the ischium, and rather less than two fifths with the ilium, whilst the other fifth remains with the pubes.

The head of the femur has been driven between the fragments of the innominatum, and lies entirely within the pelvis. It is driven so far inward that the great trochanter

no longer projects beyond the crest, but touches the outer surface, of the ilium; it has even worn away, by its friction, the prominent upper margin of the acetabulum, and formed a shallow excavation on the outer surface of the ilium, into which it fits. The attenuated articular edge of the ilium rests upon the top of the neck of the femur close to the trochanter. The body of the ischium is displaced inwards, and encroaches on the cavity of the pelvis.

Although the fragments of the innominatum are enlarged by considerable quantities of callus, yet no osseous union of the fractures has been accomplished. An incomplete new socket has been formed by the articular portions of the ischium and pubes, which expand into broad cup-shaped plates around the displaced head of the bone. A large gap, however, exists at the upper and inner part of the new socket, in which the head appears and partly projects; and the ischium and pubes do not meet below the neck at all. So firmly, nevertheless, was the femur bound in its new position, that it could not have been dislodged without the division of the thick fibro-cartilaginous substance which united the fragments together.

The proper structures of the joint were nearly destroyed. The whole of the cartilage had disappeared; and the articular surfaces of the macerated fragments are everywhere rough and porous and present only on the ischium any of the characters of an articulating bony surface.

The *right* os innominatum is broken into two fragments by two fractures, which extend into the thyroid foramen. The upper fracture is situated just in front of the acetabulum; its extremities are much enlarged by a deposition of callus, but have not united, and they meet by a ball-and-socket shaped surface,—the broad and hollowed pubic fragment embracing the convex and enlarged portion next the acetabulum. The surfaces being very rough, and having been held together by fibro-cartilage, were capable of very little motion over one another.

The fracture of the ramus of this (the right) bone severs the ischium from the pubes precisely at the line of their

original junction; that of the left innominatum was broken nearer the ischium. Though their broken surfaces are rounded off and covered with compact bone, yet neither on the right nor on the left side has the fracture of the ramus been effectually repaired.

Thus, on the right side the innominatum is broken *in front of* the acetabulum, and has not reunited, but the hip-joint is uninjured: on the left side the fracture breaks *through* the acetabulum, and has also not been repaired; while the articulation is constituted by the ilium and the top of the shaft of the femur, that is, by the highest and innermost part of the old acetabulum, and the lowest and outermost part of the upper end of the femur. These injuries have, of course, given rise to considerable changes of shape and relative position, which differ on the two sides; and they have been increased in degree by the softness, which has been brought on by disease, of the bones.

On the *left* side no material change has taken place in the ilium, which was the only part concerned in locomotion on that side. For, though the weight of the body was conveyed to the left lower extremity through the shaft, instead of the head and neck of the femur, yet it was conveyed, as it naturally is, by the posterior thickened portion of the ilium. The left ischium is merely displaced, and not altered in shape.

On the *right* side, however, other changes have taken place subsequently to the occurrence of the fractures. Two of these changes are principal or fundamental ones, upon which the production of the rest has depended.

The os innominatum having been fractured just in front of the acetabulum, and across its ischio-pubal ramus, and neither of its fractures having reunited, it has missed the support which it usually obtains from the inflexibility of the osseous pelvic circle, and has gradually been bent by the weight it had to transmit from the spine to the hip-joint; it has yielded just external to the sacro-iliac synchondrosis. The acetabulum, therefore, is elevated towards the promontory of the sacrum; and the ischial ramus (the other anterior

extremity of the fragment) is raised an inch above the corresponding ramus of the pubes. Hence the antero-posterior dimensions of the whole right side of the pelvis, of the inlet, the outlet, and the right sacro-sciatic notch, are diminished to the extent to which the acetabulum and ischium are raised; and the ilio-pectineal line being unnaturally bent at its posterior part, is straighter than natural in front, and thrusts the symphysis pubis to the left of the mesial line. This last deviation is less than it would be, were not the line bent again at an angle in the contrary direction to its posterior curvature. For, from the part where the body of the pubes is broken, the linea ileo-pectinea runs forward nearly parallel to the opposite pubes, instead of forward and inward, to the crest. And yet, as both pubes form nearly a right angle at their spines, the crest is, as usual, a continuous transverse line. But all these distortions are exaggerated by a second fundamental change, which affects the sacrum. The right limb, having a sound hip-joint, must necessarily have been more used than the left; while, at the same time, it was removed further off from the centre of gravity than the left limb, by the whole length of the neck and head of the femur. The spinal column, therefore, in transmitting more weight to a greater distance, has acquired a curvature forward and to the right in the lower lumbar and upper sacral regions. But the inordinate pressure on the right side has been felt in the pelvis as well as in the spine, and has not only increased the bending of the ilium and ilio-pectineal line, but so compressed the right lateral mass of the sacrum, as to deprive it of three-quarters of an inch of its natural breadth. The whole right innominatum is, therefore, brought by so much nearer the mesial line, and the deformities of the right side of the pelvis are accordingly increased.

The vertebræ are depressed, as well as displaced laterally, and the third instead of the fifth lumbar is on the level of the nearest part of the crest of the ilium. The lower half of the sacrum and the coccyx, sweeping forward into the perineum, compensate for the excessive inclination of the sacrum backward below the lumbar curve.

The case thus detailed presents points of much interest both to the obstetric and to the surgical practitioner.

I. The pelvis, in its form, resembles that which is known as the *triangular* pelvis. The *inlet* is shaped like a triangle with its sides pressed in. From the promontory of the sacrum to the right acetabulum, there is a distance of only an inch and a quarter, while on the left side the ischium is no further than half an inch from the promontory; and the pubic fragment rises over the head of the femur to within an inch and a quarter of the top of the last lumbar vertebra. I presume there will be no difficulty in admitting that such an inlet, in a female, would be impassable. So little, indeed, is it capable of giving passage to the head of a child, that it will not admit the head of its own femur. The capacity of the *pelvis* itself is, proportionally, even more diminished by the approximation of the innominatum and sacrum on the right side, and by the intrusion of the head of the femur and the body of the ischium on the left. The projection of the coccyx forward, and the elevation of the right tuber ischii, considerably narrow the *outlet*, and would contract it to an extreme degree, were it not that the tuberosity of the left, or displaced ischium, is everted.

It is of further importance with reference to Midwifery, as it adds, I believe, a new cause to the list of those from which deformity of the pelvis may be expected. The causes in this pelvis are different on the two sides. Of that which occurred on the left side, viz., a dislocation of the femur through a broken acetabulum, I am aware of two instances;[1] of that to which the very serious contraction of the *right* side is due, viz., the gradual elevation of an acetabulum unsupported by the pubes in front, I am unacquainted with any previous example. It is interesting, however, to observe that the pelvis partakes of the deformities which are produced by a

[1] Surgical Essays, by Sir Astley Cooper and Benjamin Travers, vol. i, p. 51; Moreau's 'Icones Obstetricæ,' by J. S. Streeter, Plate XII. The original of this plate is in the Musée Dupuytren, in Paris.

congenital absence of the lateral mass of the sacrum on the one hand, and on the other by the weakness of the bones which is consequent on rickets and mollities ossium.

II. In a surgical point of view the case is interesting, as being one of recovery from, perhaps, as severe an injury of the pelvis as any on record. None of the fractures have united indeed, but the man's life was not destroyed; and though he continued lame through life, yet he walked without marked difficulty. I am told that he had only a moderate limp, which is surprising when we consider that one hip-joint was so seriously damaged, and that, as the continuity of the pelvic circle of bones was destroyed, only its posterior part was concerned in locomotion. This, however, is not the only case in which very serious injury of the pelvis has not prevented its use as an organ of locomotion. On opening the body of a boy who had been crushed between the wheel of a dray and a wall, and who afterwards walked into the Hospital Surgery, not appearing seriously injured, and sat up in bed without discomfort, I found the pubes much comminuted on both sides above the obturator foramen, and fragments of bone lying between the bladder and the body of the pubes, simple fractures, through the rami of the pubes just below the symphysis, as well as through the tuberosities of the ischium, and both sacro-iliac synchondroses lacerated anteriorly—a small piece of the anterior edge of the sacrum on the right side being detached with the fibro-cartilage.

Another point of great interest to the practical surgeon, is the relation of the lower extremities to a pelvis so injured. And in this respect, again, the condition differs on the two sides, and is, I apprehend, in part unprecedented.

An os innominatum is fractured just in front of the hip-joint; no displacement is perceptible at the time, and perhaps the only proof of the nature of the accident is afforded by a large mass of callus, which is felt behind the psoas muscle when the patient leaves the care of the surgeon. After a time, however, when the patient has regained freedom

in walking, and is thought to be well, the limb of the same side becomes much shortened and somewhat inverted; and at the same time some inconvenience gradually comes on in the perineum, and increases equally with the shortening of the limb. All these symptoms would be explained by such a condition as that on the right side of the pelvis under consideration. The fracture not having united, and the bones being, perhaps, somewhat soft, the acetabulum has been elevated more than an inch, and as its aspect became more anterior the more it was raised, the limb must have been turned inward. The other anterior extremity of the fragment being raised too, necessarily encroached upon the lower part of the pelvis, and could easily have been felt pressing upon the rectum by the finger introduced within the anus.

On the left side the injury is such as must have produced very marked symptoms at the time of the accident. Some of these symptoms remain permanently, and have even been exaggerated by the subsequent changes in the pelvis. There may have been others at the time of the accident, but I do not venture to speculate upon them with insufficient data: I will mention merely those which do exist, and shall be happy if, in the interest that is so extensively felt in the Society's proceedings, the attention of the surgeon under whose care this terrible accident recovered, should be attracted to the account of its termination, and he should be induced to supply the particulars which at present are necessarily wanting.

1. The left limb is *shortened* more than two inches. This is due to the elevation of the femur, the head of which lies so high within the pelvis as almost to touch the promontory of the sacrum.

2. The trochanter major is *sunken* deeply in the hip. It could not be more depressed beneath the surface than it is, without a still greater destruction of the os innominatum. It is, in fact, in contact with the ilium; and the gradual wearing away of that bone has increased not only the loss of the natural prominence of the trochanter, but also the shortening of the limb.

3. The *position* of the limb is that of partial flexion and adduction. It is neither inverted nor everted.

4. The chief movement of which the joint is capable, is *abduction*. The facility of this movement is due to the large size and incompleteness of the new socket, in which the head of the bone is but loosely lodged. *Flexion*, too, is moderately free, and the psoas and iliacus muscles have left two deep grooves in the situation of the ilio-pectineal eminence which give proof of their vigorous action. *Extension* of the limb is quite precluded by the position of the everted tuber ischii close behind the shaft of the femur below, and of a small projecting piece of bone in front of the shallow excavation on the ilium, which meets the front of the trochanter in extension of the limb. The movement of *circumduction*, not being performed on the radius of the neck of the bone, is reduced to a mere rotation of its shaft, and even that movement could have been but slightly effected in consequence of the close manner in which the neck is impacted between the fragments of the innominatum, as well as of the disadvantageous position of the rotatory muscles attached to the depressed trochanter.

The records of surgery contain accounts of other cases of fracture traversing the acetabulum, and attended with displacement of the fragments. Sir Astley Cooper mentioned some in which the symptoms had resembled those of dislocation of the dorsum ilii. Mr. Earle, in Vol. XIX of the Society's Transactions, brought forward others, which he distinguished from fracture of the neck of the femur. It is plain that with a careful examination (and if the effusion of blood were not inordinate) the injury on the left side of this pelvis would not have been confounded with any of the ordinary fractures and luxations of the hip. For, although with considerable shortening, and some flexion and adduction, it may have resembled a dislocation upon the dorsum of the ilium, it must have been distinguished from that accident by the disappearance of the head and trochanter of the femur, by the facility of abduction of the joint, and probably by the absence of the symptom of inversion of the foot, as well as

by the severe general symptoms which such vast injuries must have occasioned. It could not have been confounded with a fracture of the neck of the femur, when the loss of the prominence of the trochanter was observed, and the joint was found freely capable of abduction.

One other subject remains to be noticed, viz., the disease of the bones. It appears to have been general throughout the osseous system, and (judging by the appearances of the left ilium and femur, and of the interior of the skull,) to have been in great part inflammatory. The irregular manner in which the bony matter is seen, under the microscope, to be accumulated, corresponds with this opinion; and the disease agrees generally with that described by Rokitansky under the name of Osteoporosis,—a rarefaction or attenuation of the osseous texture originating in inflammation and succeeded by a more or less excessive deposition of new bony matter, which gives hardness and increased weight to the bone. It is stated by him to occur in some elderly persons who bear marks of having suffered from rickets in early life. No such marks, however, were found in this individual; and the influence of the disease on the pelvis, which was limited to the narrowing of the lateral mass of the sacrum under the compression to which that part was subjected, is too slight to have been produced by a disease which softens and leads to distortion of bones so much as rickets.

I have examined numerous examples of fracture of the os innominatum traversing the acetabulum, but have found none in which the course of the fractures seemed at all determined by that of the original sutures. Nor, indeed, have I found any in which fracture was combined with disease of the bone. In healthy bones the fractures pass in any direction, quite irrespectively of former suture. But in this pelvis the line of fracture through the left acetabulum, and the right ischio-pubal ramus, corresponds precisely with that of the original suture. The instance is a solitary one; yet I may venture to suggest the question, which future observation may solve, whether this disease in producing

expansion and softening of the bones does not sometimes chiefly affect and reopen the sutures, reducing the bones to the condition which is natural to them in early life.

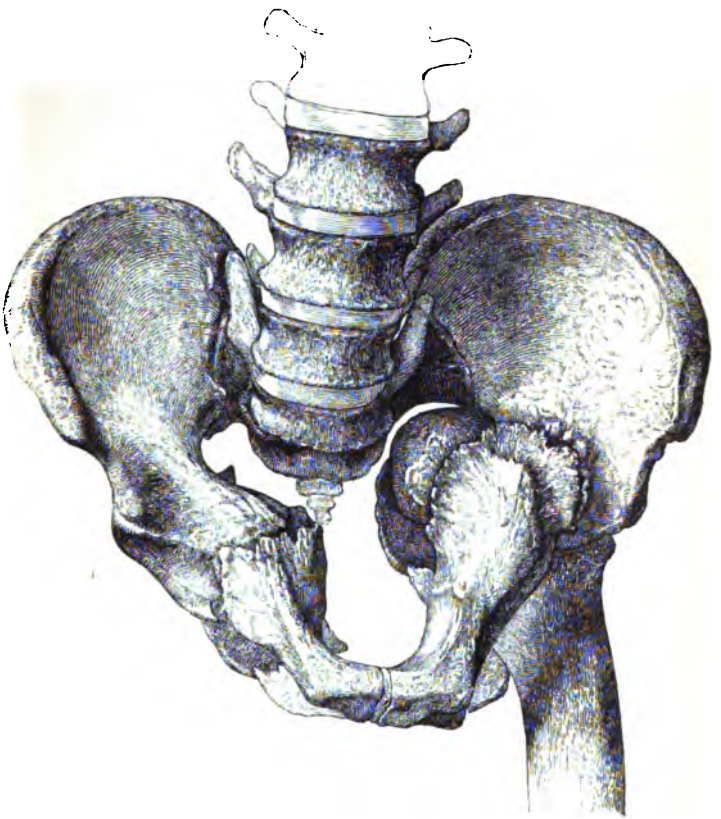
Lastly, I regret that the want of the history of the case should prevent a certain conclusion being drawn as to whether the failure in the process for repairing these fractures, although so much callus has been thrown out upon the bones, is to be attributed to the disease or to any accidental cause.

EXPLANATION OF THE PLATES.

PLATE I.—Front view of the Pelvis and left Femur, described in Mr. Moore's paper.

„ II.—View of the same Pelvis from the left side. The left Femur has been removed; and portions of the right Ischium and Pubes are seen through the left Thyroid foramen and the broken Acetabulum.

The Pelvis is in the Museum of the Middlesex Hospital.



W. HAGG.

W. BAGG.

EXPERIMENTS

ON

CHYLOUS OR CHYLO-SEROUS URINE.

BY

JOHN MAYER, ESQ.

ASSISTANT SURGEON TO THE SECOND NATIVE VETERAN BATTALION.

WITH

A HISTORY OF THE PATIENT.

BY

GEORGE PEARSE, M.D.

GARRISON-SURGEON OF BANGALORE.

COMMUNICATED BY

H. BENCE JONES, M.D. F.R.S.

Received January 30th.—Read March 11th, 1851.

The experiments to be detailed were made at the request of Dr. Pearse, Garrison-Surgeon of Bangalore, who was desirous of ascertaining the real nature of the matters that imparted to the urine, passed by one of his female patients, the peculiar characters which have received the titles given in the heading.

For the attainment of the object in view, it will at once be seen, that no extended analysis of the whole constituents of the urine was required, nor were any quantitative determinations needed.

The absence or presence of caseine, in any recognisable form, was the first point to be ascertained. The secondary points to be attended to were the absence or presence of pus and phosphates, these being the only known bodies which, when diffused through healthy urine, were likely to

cause it to be mistaken for urine, such as that about to be described.

The specimen of urine, brought for examination, appeared of a dirty milk colour, resembling gum ammoniac mixture; its consistence somewhat thicker than milk, and its smell very faint; indeed the urinous odour was scarcely perceptible: the sp. gr. was about 1·013.

Experiments.	Results.	Deductions.
No. 1. Portion of the urine placed on a filter of common bibulous paper.	Passed through, milky and unaltered, nothing perceptible being retained on the filter.	Absent, pus and mucus.
No. 2. Litmus paper immersed in the urine.	Became faintly reddened.	Absent, any strong alkali. The fear that albumen, if present, might, when the urine was heated, be held in solution by alkalies, was thus removed.
Turmeric paper immersed.	Remained unaltered.	
No. 3. Boiled, per se, in a flask, the contents then placed on a filter.	Remained on the filter a copious white precipitate, on the surface of which there was some matter resembling fat.	Present, albumen, with some other matter, to be further investigated.
No. 4. Filtrate from No. 3, which now appeared perfectly clear, like ordinary urine, having been collected in another flask, treated with strong acetic acid guttatim.	No clouding, no precipitate, nor perceptible change of any kind.	Absent, probably caseine.
No. 5. Flask containing the filtrate from No. 3, plus acetic acid, exposed again to boiling temperature for some minutes.	No opacity, nor appearance of anything like curd.	Absent, caseine.
No. 6. Two parts of the urine and one of æther were placed in a stoppered phial, which, after being closed, was briskly agitated two or three times for about half a minute.	The contents of the phial now became clear, dividing into three portions; two of which were fluid, the third semi-solid, this portion occupied a space in the phial between the two fluid portions; the upper fluid was distinguished, not only by its position but by the smell, as æther; its colour, however, was somewhat altered, it had now a faint yellow tint. The semi-solid portion was a tremulous	Present, some fatty matter, previously combined with the semi-solid portion, but which was separated from it by the superior affinity of æther for such substances. Present, in the form of the semi-solid, jelly-like coagulum, either albumen or fibrine. This substance, when combined with the matter held in solution by the æther, forms the milk-like matter, that so disguises the urine.

Experiments.	Results.	Deductions.
	jelly-like coagulum. The third portion, which occupied the lowest part of the phial, was urine as it usually appears.	
After standing three weeks, the phial and contents were again examined.	No perceptible change had taken place, except that the upper or the ætherial portion of the contents of the phial had deposited a semi-crystalline matter, much resembling stearine, on that part of the internal surface of the phial with which it was in contact.	The deposition of the fatty matter arose from the partial evaporation of the æther, the phial being but very loosely stoppered.
No. 7. A small slip of blotting-paper was rubbed against the internal surface of the phial, so as to become smeared with some of the matter deposited there.	The smeared paper, when rubbed between the fingers, became partly transparent, as happens with paper substances.	Deductions from No. 6 confirmed.
No. 8. Portion of the urine treated with nitric acid in a test-tube.	Copious deposition of a white flocculent precipitate.	Absent, phosphates. Presence of albumen confirmed.
No. 9. Portion of the urine placed in a stoppered phial, with some strips of lead, and well agitated.	No deposition of coagulum or filaments on the lead.	Absent, fibrine.

After an interval of three weeks, a second specimen of chylous urine, from the same individual, of precisely similar appearance, was obtained; the experiments made with the first were repeated, with the same results. The details are, therefore, not given: they are mentioned merely as offering confirmation of those recorded.

The general deductions from all the experiments made, are:—first, the absence of caseine; second, the absence of pus and phosphates; third, the presence of albumen; fourth, the presence of animal fat, which confers on the urine its milky appearance.

To test to the utmost (as far as the time and means at my disposal would permit) not only the truth of the above general deductions, but the delicacy of the direct method, an indirect mode of proof was employed; it consisted in treating

artificial mixtures of milk and urine by the method used in the examination of the chylous urine. In this case, if the previous deductions be correct, the results will be reversed. The first series of experiments was made with cow's milk and healthy human urine. The second series with human milk and healthy human urine. These artificial mixtures were made to resemble, as much as possible, in appearance the chylous urine. The difference of the sp. gr. between the chylous urine and such mixtures was not determined.

Experiments.	Results.	Deductions.
No. 1. Two parts of milk and one of æther were agitated in a phial.	No clearing, as in the case of the chylous urine; no effect, but that of being somewhat less white, looking as if diluted with water.	Absent, the matter that the æther takes up from the chylous urine.
No. 2. A mixture of cow's milk and healthy human urine, made as described, agitated with a little æther in a phial.	No clearing whatever; escape of some gas, with effervescence, the nature of which I had not time to examine.	Absent, the matter which æther takes up from chylous urine.
No. 3. A fresh portion of healthy human urine and cow's milk, mixed as before, amounting to about ʒiv, boiled for some time, probably ten minutes, after cooling filtered.	No precipitate nor deposit of any kind in the flask. Slight pellicle on the surface formed while boiling.	Absent, any matter coagulable by heat, except the pellicle, which is a well-known form of caseine.
No 4. Filtrate from No. 3, treated with acetic acid, a few drops.	Copious and immediate precipitate of white curdy matter.	Present, caseine.
No. 5. A mixture, as before, of cow's milk and healthy human urine, tested by litmus paper.	Scarcely any perceptible action; if any, slightly acid.	Absent, any free alkali that could hold albumen in solution, had it been present.

From these experiments it follows:—

1st. That æther, by simple agitation, does not take up those parts of milk which give it the well-known white appearance.

2d. That when urine and milk are mixed and agitated with æther, although a well-marked action takes place, no clearing whatever ensues, the æther being in these circumstances equally incapable of taking up the particles that give to the mixture its peculiar appearance.

3d. That an artificial mixture of cow's milk and healthy human urine will afford, by boiling, no trace of albumen, contrasting with the behaviour of chylous urine, under similar treatment, in a most striking manner.

4th. That although no trace of albumen could be detected by continued boiling (no uncombined alkali being present in the mixture), an immediate precipitate of caseine follows on adding acetic acid to the boiled artificial mixture, and again boiling,—this being exactly the reverse of what takes place when chylous urine is similarly treated, showing in the one case the total absence of caseine, and in the other the simplicity of its detection when present.

Previous to following out the plan of proof which I had laid down for myself, I was desirous (never having previously experimented with human milk) of gaining such information as I could, relative to this kind of milk, and its behaviour with reagents: with this object, I consulted all the chemical works in my possession. In by far the greater number, nothing is said of peculiar kinds of milk—cow's milk being taken as the type of all; however, in Professor Brande's 'Manual of Chemistry,' these passages occur:—"Its albumen or caseine (meaning that of human milk) is said to furnish soluble compounds with acids, so that it is not coagulated by them. Of fifteen samples, only three were coagulated by acetic and hydrochloric acids," &c. (see p. 1361, vol. ii, of the fifth edition); and in Dr. Thomson's 'System of Chemistry,' (p. 502, vol. iv, sixth edition,) are the following words:—"None of the methods by which cow's milk is coagulated succeed in producing the coagulation of woman's milk," &c. Dr. Thomson quotes from Clarke, 'Irish Transactions,' vol. ii, p. 175. Dr. Gregory says:—"If carefully neutralised by an acid, milk is not coagulated, but it is then coagulated by boiling." ('Outlines of Chemistry,' p. 535.) Dr. Turner, in the eighth edition of his 'Elements of Chemistry,' though published two years later than Dr. Gregory's 'Outlines,' says not a word regarding the behaviour of milk in the circumstances under consideration.

After perusing these conflicting passages, I little doubted

that it would be necessary to seek for some new mode of proof; but being unwilling at once to abandon the method I had first proposed, and so far pursued with the most satisfactory results, I obtained specimens of milk from three women, which I numbered 1, 2, and 3. A small portion from each of these was treated with acetic acid, only the portion from No. 2 gave a precipitate; the quantity of acid was increased gradually with the two other portions, but without effect.

Another portion from each specimen was treated with half its bulk of strong acetic acid, still only No. 2 gave a precipitate. Fresh portions of each were boiled, and then small quantities of acetic acid were added to each, the effect being as before. Again, fresh portions from each were taken; acetic acid in small quantities added; all three were boiled; all three gave a precipitate, which remained in each case at the surface of the fluid. This slight difference in the mode of proceeding appeared to promise all that I wished; but before proceeding further, I obtained two new specimens of human milk, neither of which gave a precipitate by the simple addition of acetic acid, but both readily did so after boiling. Not to take up more time by further details, it will suffice to state, that I treated eleven specimens of human milk, obtained from different females, in the manner above stated; of these, four gave a precipitate by the simple addition of acetic acid—seven refused to do so,—all readily afforded a copious precipitate by boiling, the acid having been first added. Sixteen specimens of human milk, obtained from different females, having now shown the same behaviour, I had sufficient confidence in the method; but before trying its efficacy in the presence of urine, I was anxious to ascertain its delicacy; half a drachm of human milk was therefore diluted with 8 ounces of water, and 20 drops of dilute acetic acid added; the whole boiled. The reaction not being sufficiently distinct, I added 24 or 25 minims of the same milk, and half a drachm of dilute acid, and boiled again; a copious precipitate, white and flocculent as usual, occurred. In an imperial pint of water at 62° there are 8750 grains; and in

half a pint (the quantity of water used to dilute the milk) 4375 grains; and in 1 drachm of human milk, the sp. gr. of which does not vary much from that of water, there will be about 55 grains. Now the mean of three analyses quoted by Professor Brande, gives in 100 parts of human milk, two of caseine (or 2·25): from these data, it is evident that 55 parts will contain 1·23 grains of caseine,—and if, as the experiment proves, we find 1·23 grains of caseine in 4375 water + 55 milk + 55 acid = 4485 grains of fluid, the reaction is sufficiently delicate for all practical purposes, being in whole numbers 1 grain discernible in 3646. Having thus removed an apparent obstacle to the intended method of investigation, I proceeded to make the following experiments:—

Experiments.	Results.	Deductions.
No. 1. Two parts of human milk, with one of æther, agitated in a phial.	No clearing whatever, the action being precisely similar to that with cow's milk.	Absent, that matter which the æther takes up from chylous urine.
No. 2. An artificial mixture of human milk and human urine, made as before, agitated with æther.	The action, in this case, is exactly similar to that with cow's milk.	Absent, that matter which æther takes up from chylous urine.
No. 3. An artificial mixture of human milk and human urine, made as before, boiled and filtered.	No precipitate; slight pellicle on the surface of the fluid, separated by the filter, the fluid passing through unchanged.	Absent, all traces of albumen; the pellicle being, as before observed, a form of caseine.
No. 4. The filtrate from No. 3, treated with acetic acid, and again boiled.	A copious white, curdy, flocculent precipitate.	Present, caseine.
No. 5. A mixture, as before, of human milk and human urine, treated by litmus paper.	No perceptible action.	Absent, any uncombined alkalies that could hold albumen in solution, had it been present.
No. 6. A mixture of healthy human urine ℥j, white of egg 3j, mixed with ℥ss of water and 3ij of human milk, boiled, and then filtered.	Opaque white precipitate, which, after the filtrate had passed through nearly clear, was kept on the filter.	Present, albumen.
No. 7. To the filtrate from No. 6 added 3ss of dilute acetic acid, the whole boiled and afterwards filtered.	White candy precipitate after boiling some time; precipitate left upon the filter.	Present, caseine.

Experiments 6 and 7 were repeated, with the serum

of blood, instead of white of egg, with precisely similar results. Before their bearing on this subject is noticed, the results of this series, as far as No. 5, when compared with those of the second series, show that they are identical; comfirmation stronger could not be desired. Both series show, that caseine, in either of the forms taken, is, in the presence of urine, easily detectable; consequently it would have been discerned had it been present in any of the specimens of chylous urine examined. Experiments 6 and 7 show, that although there may be present also albumen in quantity, the caseine is still to be detected, while its presence in no way interferes with the detection of albumen; hence, it is evident we can always be sure of detecting either of these bodies, or all, when present in urine. The detection of fibrine is less insisted on than that of the other two bodies, as the spontaneous coagulability of the fibrine at once announces the presence of this substance; but the facility of detecting fibrine, albumen, and caseine, all or singly, is not the only result of these experiments; henceforward, no fraudulent mixture of milk with urine can pass without being detected. The negative action of æther on such mixtures, the absence of a precipitate by boiling, and a precipitate obtained by boiling after adding acetic acid, will immediately point out the deception.

STATEMENT OF A CASE OF CHYLOUS OR CHYLO-SEROUS URINE.

BY

GEORGE PEARSE, M.D.

About the end of March, 1850, I was requested to visit Mrs. Catherine R—, an Indo-Briton, ætat. 22 years, married, and the mother of three healthy children, the youngest of whom, ten months old, is a particularly strong and healthy infant. She has been nursing up to the present time, although, of late, with a very scanty supply of milk. She is a tall young woman, very thin, but of a healthy appearance, and, according to her own account, her general health is very good. When nursing her two eldest children, which she continued to do until they were fourteen or fifteen months old, she states, that she observed, for some time previous to weaning them, that her urine had become white like milk, which peculiar appearance it lost soon after she discontinued nursing.

Towards the end of November last, her infant being then about five months old, her attention was again attracted to the peculiar white appearance the urine had assumed, when she applied for medical advice, and the following is the account of her condition, given by the medical officer by whom she was then attended.

"Appeared pale and weak, and complained of general debility and loss of tone in the system. She had been confined some months before, and was then nursing a very large vigorous infant. The urine, for some time previous to her application for treatment, had particularly attracted her attention; when seen then by me, it was of a pale milky appearance, and, on cooling, became gelatinous, and frequently was of more than usual quantity. This appearance

of the urine had been noticed after former confinements while nursing, and had disappeared shortly after her children were weaned. I was of opinion that a nurse should be procured for the child, when, as on former occasions, it was to be hoped, the drain on the system being removed, the kidneys and other organs of the system generally would take on a more vigorous action: the patient being unwilling however, for many reasons, to give up nursing, with the view of giving tone to the system, and, if possible, putting a stop to this unhealthy secretion from the kidneys, various tonics were used, as Columba and Quinine. An occasional laxative of Rhubarb and Magnesia being, at the same time, used when necessary.

"During this course of tonics, the patient had an attack of simple continued fever, which was treated in the usual way. Quinine and the Muriated Tincture of Iron were again used; the Infusion of Gentian with Quinine, the Decoction of Cinchona, and the Mineral Acids, with a few alterative doses of blue pill occasionally, and a warm plaster to the loins, were also latterly ordered. Port-wine and a generous diet being, at the same time, the regimen adopted.

"As no effect, however, was produced on the appearance and character of the urine by the above treatment up to the end of January, 1850, although the general health did not seem more impaired than at first, a change of air to Bangalore was advised."

Mrs. R— having resolved to come to this place, a distance of about sixty miles, for further advice, states that, on the journey, which occupied nine days, she suffered from a slight attack of fever, lasting one or two days, but says she is now in her usual good health. The bowels are said to be regular, and appetite pretty good, but it is always very moderate and small; tongue clean; pulse 90; no unusual thirst; has no feeling of uneasiness in the region of the kidneys or epigastrium; no night sweats, and sleeps well. The first specimen of the urine seen by me, was passed early in the morning, and was nearly as white as pure milk, and in moderate quantity. This was accidentally spilled. The

next specimen obtained, passed also before breakfast, formed a thick, but not firm jelly, in the glass in which it was contained, and was of the same whitish appearance as the first; the only test applied to it was a few drops of diluted nitric acid, which caused it to separate into a serum, having a firm coagulum in its centre. The patient was at once made to wean her child, and a course of tonic treatment recommended, the following mixture being given:—

℞ Ferri sulphatis, grs. xij;
Aquæ, ʒviij;
Quinæ sulphatis, grs. xviij;
Acid. sulph. dilut., ♏xx;
Mft. mist.;

the bowels being kept regular by occasional small doses of her usual aperient (Castor Oil); and she was advised to be as much in the open air as possible, morning and evening. About the middle of April an opportunity offered of having the urine carefully analysed; but the specimen then obtained, though still retaining the milky appearance, had a reddish-brown tinge, evidently from containing a large admixture of healthy urine; it did not coagulate as before, though the patient herself declares that it always does form a jelly when allowed to stand for some time without being agitated. Her answers to questions regarding her health are still the same, viz., that it is very good, and that there is nothing particular the matter with her beyond the condition of the urine. She, however, appears to me to have lost flesh, but neither she nor her friends, her father being an intelligent European sergeant, perceive any change in that respect, and she is anxious to be allowed to rejoin her family at Hoonsoor.

CASES ILLUSTRATING SOME DIFFICULTIES IN THE DIAGNOSIS OF PLEURITIC EFFUSION.

BY

T. A. BARKER, M.D.

PHYSICIAN TO, AND LECTURER ON THE PRACTICE OF MEDICINE AT, ST. THOMAS'S HOSPITAL.

Received January 31st.—Read May 27th, 1851.

Case I.—John Isaacs, æt. 26, a labourer, of moderate stature and size, was admitted into St. Thomas's Hospital on Jan. 1, 1850. He had been subject to severe dyspnœa for three years, and an attack of more than ordinary severity commenced two months before his admission into the hospital.

When first seen by me, the countenance was expressive of great distress, the face and lips were dusky, the veins of the neck much distended, and the respiration frequent, laboured, and not quite regular.

The pulse was rapid, but too feeble to be counted. The sounds of the heart could be heard, but they were very faint, and not regular, some beats apparently being too feeble to be audible. The cardiac region was as resonant as any part of the left side of the chest. The impulse of the heart could not be felt. There was great dullness on percussion over the whole of the right side of the chest; and no respiratory sounds could be heard in the right lung, except at the upper and lower parts anteriorly, where very faint breath-sounds could be distinguished occasionally.

The left side of the chest was very resonant in every part, including the cardiac region; and throughout the whole of the left lung the natural breath-sounds were replaced by

rhonchus, sibilus, and large crepitation. The ribs on the left side were elevated as much as possible at each inspiration; the right ribs were nearly fixed. There was not much cough; the expectoration was of moderate amount, mucous and tenacious.

The man lay constantly on the right side, the body being bent a little forwards; and lying on the left side, or even on the back, immediately brought on most distressing anxiety, and a sense of impending suffocation. He never assumed any other position, when recumbent, up to the time of his death.

Eighteen leeches applied to the sternum, and full doses of Tartar Emetic, gave a little relief; but the next day all the symptoms above enumerated were increased. From the first I had entertained a suspicion that this might be a case of severe bronchitis in the left lung, with extensive effusion into the right pleura, and that the usual symptoms of effusion were somewhat modified by old adhesions.

The following points appeared to favour this view:—

1. The patient's position in bed. As already stated, he constantly lay on the right side; and a change from that to any other position, except the erect posture, seemed to threaten immediate suffocation.

2. The great and universal dullness on percussion of the right side.

3. The absence of respiratory sounds on the right side, with the exception of the very feeble murmurs heard at the apex and base of the lung anteriorly.

4. The almost fixed condition of the ribs on the right side.

On the other hand, it might be urged that nothing in the history of the case indicated a recent attack of pleuritis, and the symptoms had come on more gradually and had existed longer than seemed consistent with the supposition that they were caused by a great and rapid effusion into the pleura. Moreover, there had been several similar attacks, though not so severe, from which he had recovered more or less completely. Measurement of the chest did not lead to

any satisfactory conclusion. The extreme restlessness of the patient, when disturbed, together with the rapid and laboured breathing, rendered careful measurement impossible, and, after many attempts, I felt a doubt which side was the larger; but the difference, if any, was very slight. I did not, however, attach much importance to this equality in the circumference of the two sides of the chest. Two years ago I had a patient from whose chest 160 oz. of serum were withdrawn by a trocar, and yet, repeated measurements by three persons had not shown any enlargement of the affected side.

The evidence from the voice was negative; no vocal thrill could be felt on either side.

The faint breath-sounds heard in two places on the right side might depend on old pleuritic adhesions.

Taking all these circumstances into consideration, I thought extensive effusion probable, but not certain. But it was manifest that the right lung was useless;—no respiration was going on in that organ;—the patient's danger was great;—if there was fluid in the pleura an operation might relieve him;—if there was no fluid, a puncture, under the existing circumstances, could not do harm.

My colleague, Mr. Le Gros Clark, at my request, introduced a very fine trocar between the fifth and sixth ribs, about half-way between the sternum and the spine. No fluid escaped through the canula, but the cellular membrane immediately became slightly emphysematous. A piece of lint and adhesive plaster were placed over the wound; and except the slight pain of the puncture, the operation did not cause the least inconvenience.[1]

No change took place in the character of the symptoms.

[1] I have great doubt whether the introduction of an ordinary grooved needle is, in all cases, sufficient to test the presence of fluid. My colleague, Mr. James Dixon, once used such a needle, and no fluid passed along the groove; but so confident did I feel of the presence of fluid in the chest, that I requested him to use a very fine trocar. He introduced this very carefully; and on withdrawing the trocar, thin serum flowed out freely. About two quarts were withdrawn.

On the sixth, four days after the operation, the man said he felt more comfortable; he sat up in a chair before the fire, and, without having made any complaint, expired rather suddenly.

Sectio Cadaveris.—The right side of the chest was very dull and the left very resonant after death. The cellular tissue around the wound which had been made by the trocar was slightly emphysematous.

The left lung was emphysematous; the disease was not very much advanced in any one part, but the whole lung appeared to be more or less affected. The left bronchial tubes were red and injected, and contained a little mucus. The heart was completely overlapped by the edge of the lung, and was pushed under and partly to the right of the sternum; indeed the emphysema of the left lung had acted on the heart and mediastinum exactly in the same way as very extensive pleuritic effusion would have done;—the heart being displaced in the manner just stated, and the mediastinum being pressed laterally so as to encroach very greatly on the right side of the chest. To such an extent had this gone, that the central part of the mediastinum was not more than two inches from the right ribs.

On the right side the pulmonary and costal pleuræ were universally adherent by delicate but perfectly-formed cellular tissue, which could be separated by the fingers without lacerating the lung. The lung itself contained scarcely any air; it was pale and bloodless, and very closely resembled healthy lung which has long been compressed by effusion into the pleura. It was described by Mr. William Adams, who made the *post-mortem* examination, as "diminished to less than one fourth of its natural size, and disposed in the form of a thin layer adherent to the thoracic parietes." It was just possible to trace the line of the puncture which had been made by the trocar. Besides the diminution in the capacity of the right side of the chest, caused by the encroachment of the left lung, it was still farther lessened by the liver, which, though not enlarged or otherwise diseased,

extended so high into the chest, that the diaphragm had narrowly escaped being wounded by the trocar, though the instrument, introduced above the sixth rib, had been carefully passed upwards.

The condition of the lung in this case was such as I never saw before, and have not known to be described by others. It appears to me that the only explanation which can be given of the alterations which had taken place in the chest, is the following:—That there had, at some former period, been pleurisy with effusion on the right side; that the fluid had subsequently been absorbed, but that the compressed lung had not again expanded, and had become adherent to the ribs. Under ordinary circumstances, these changes would have caused great and evident contraction of the right side of the chest; but in the case now under consideration, this contraction had been prevented, partly by the opposite emphysematous lung and the heart, and partly by the liver occupying the space which had previously been filled by the right lung.

In addition to the unusual morbid changes detailed giving rise to insuperable difficulties in arriving at a correct diagnosis, this case is interesting as an example of the impunity attending a trial operation, by means of a grooved needle or fine trocar, in doubtful cases of hydrothorax or empyema. Having ascertained in this case, that if there was not fluid in the chest,—the presence of which I certainly thought highly probable,—there was at all events some very great impediment to the entrance of air into the lung, and, being assured of this, I entertained no fear of serious mischief arising from a puncture of that organ.

Case II.—William W—, æt. 45, a flute-player, admitted Jan. 14, 1851. He stated that he had enjoyed good health until four months prior to his admission, when he was attacked with very severe pain, first in the left, and subsequently in the right iliac and lumbar regions. He was bled and salivated; and, in a fortnight, though not quite well, returned to his work. He soon became ill again, and

after attending as an out-patient at St. Bartholomew's Hospital, and elsewhere, he was admitted as my patient, bringing a note from his last medical attendant, stating that he had had rheumatism and pericarditis, and was then labouring under valvular disease of the heart.

When first seen by me, his countenance was expressive of much suffering. He had no headache, but said he had lately been much troubled by muscæ volitantes. His speech had become thick and indistinct within the last few weeks; and within the same time, he had almost lost all power in his lower extremities, having a little power only in the right leg, but none in the left; sensation, however, was not impaired. Respiration was short, hurried, and chiefly abdominal; the lower ribs on the left side did not move at all. The resonance of the anterior and lateral parts of the chest, on both sides, was natural, and the respiratory sounds were healthy, with the exception of slight rhonchus. When he lay on the back, with the shoulders a little elevated, he suffered little pain so long as he remained perfectly still; but, turning to either side, rising up, coughing, drawing a deep inspiration, or making any other movement of the trunk, caused most excruciating pain. The seat of pain was stated to be limited to the left side of the body, occupying the lowest part of the chest and the abdomen on that side; and this, he said, had for some time past been the sole seat of his sufferings. So great was the agony caused by turning to either side, or sitting up, that it was with great difficulty he could be placed in such a position as to enable me to examine the back of the chest. Nevertheless I satisfied myself that the chest was everywhere sufficiently resonant, and that healthy respiration was going on in the posterior parts of both lungs. Percussion of the two lowest dorsal and upper lumbar vertebræ caused pain of the same kind, and limited to the same parts, as any movement of the trunk had done. Although he was said to have had rheumatism and pericarditis, and to be then suffering from valvular disease, the account he gave of his case would not have led me to suppose that he had had the two former, and

I could not detect any evidence of the latter disease. He had been repeatedly blistered over the left side of the abdomen; but no blisters or leeches had been applied to the cardiac region. The pulse was about 100, small, and soft.

My examination of this case not having led to the detection of any symptom of disease in the viscera of the chest or abdomen, I could not account for the excruciating pain in the left side, unless the spinal cord was diseased at the lower part of the dorsal division; the seat of the pain, the fixed state of the lower left ribs, the feeble condition of the lower extremities, and the complete paralysis of the left leg, could all be accounted for on the supposition that this disease of the cord existed; and the severe pain caused by percussing the lower dorsal and upper lumbar vertebræ, strengthened this view. Except in two respects, the symptoms did not change their character, and no others supervened up to the time of his death. After he had been slightly affected by mercury, he became quite free from pain, so long as he remained completely at rest; but any movement of the trunk continued to cause as much agony as when he was first admitted, and consequently he always lay on his back, with the shoulders a little raised. The respiration gradually became more hurried, and a very slight cough became more troublesome. Four days before his death no change had taken place in the respiratory sounds, except that the rhonchus was rather louder and more general than when he was admitted, and the posterior part of the chest had become a little more dull on percussion on the left than on the right side, with a corresponding feebleness of the respiratory sounds, these changes being more remarkable in the lower than in the upper portion of the back. Two days before his death, although he made no complaint, observing that the respiration had become much more rapid, I again examined the chest completely. On the right side there were the ordinary sounds caused by slight and partial bronchitis; on the left, over the anterior and lateral parts, that is, over the whole portion which could be examined

whilst he was recumbent, there was tolerably good resonance, though not quite so clear as on the right side, and slight sibilus and rhonchus could be heard everywhere. On placing him in the erect position, I found the whole of the back of the chest gave a very much duller sound, when percussed, on the left than on the right side; and over the same parts, the respiratory sounds were feeble and distant. I could not hear œgophany; and the change in the patient's position did not cause the least alteration in the sounds heard, either on percussion or auscultation, in the anterior parts of the chest.

The patient had gradually been becoming feebler, and the tongue dry and brown, but the mind was not affected; and there was no other change in the symptoms except those already mentioned. He took a good deal of nourishment and stimulus, but died two days after the last examination of the chest, and seven days after his admission into the hospital.

The *post-mortem* examination was made on Jan. 22, twenty-four hours after death. The arachnoid, covering the upper part of the anterior and middle lobes of the brain, was white and opaque; and, when cut through, it was found that this membrane, together with the pia mater and intervening areolar tissue, formed a dense layer, a line in thickness, extending over and dipping between the convolutions. The brain was healthy. The spinal cord and its canal were most carefully examined, but exhibited no mark of disease in any part, excepting on the arachnoid of the cervical portion, where there were a few small white patches. The viscera of the abdomen were quite healthy. The heart was of natural size and structure. On the mitral valves were a few patches of atheromatous deposit; and, at the base of each aortic valve, was a minute quantity of earthy matter. The pericardium contained ʒss of serum, and there was an old, firm adhesion, of small size, at the back of the left ventricle. The right lung collapsed, and was quite healthy. The left lung collapsed, but did not fall to the back of the chest; it was found to be floating on fluid. This fluid was confined to the back part of the chest by a narrow line of

pleuritic adhesion, extending from the upper part of the root of the lung to the top of the chest, behind the apex, and continued along the ribs to the diaphragm, which it joined about half-way between the ensiform cartilage and the vertebræ. A portion of the base of the lung being adherent to the diaphragm, completed the separation of the left side into two cavities. The pleura of the anterior and larger cavity, was perfectly healthy; that lining the posterior part was completely coated by a thin layer of loosely adherent granular lymph. This cavity contained about three pints of dirty serum, mixed with granular matter, offensively fetid; and there was also a considerable quantity of air. The lung was quite healthy, with the exception of one spot, the size of a filbert, at the lower and posterior part of the upper lobe, from which it was evident that a gangrenous slough had recently separated. The cavity resulting from this communicated with a small bronchial tube. The line of adhesion between the pleuræ was in no place more than half an inch broad. In some parts of this line, the adhesion, though evidently recent, was firm; but in others it was so slight, as to cause surprise that the weight of the fluid, when the body was moved, had not separated it. I think it very probable that the completion of the communication between the sac of the pleura and the bronchial tube, had only taken place very shortly before death. When the chest was last examined by me, the man being erect, there was no resonance at the upper part, which must have been the case, if air had then been present; and after the examination had been made, I ascertained, from the sister of the ward, that, although the man had died "very easily," as she expressed it, his respiration had, rather suddenly, become much accelerated about two hours before death.

The *post-mortem* appearances in this case fully account for the symptoms referable to the chest, which were observed two days before death; but they do not, in my opinion, explain the long-continued and severe pain in the left side of the abdomen and left lumbar region. It is true, that both in pneumonia and pleurisy, some other part than the chest is often stated to be the seat of pain; but, in this case,

though there may be a doubt as to the exact time when the pleurisy commenced, it is quite certain that the pain in the abdomen preceded it by many weeks. The only other morbid change observed was the disease in the arachnoid and pia mater, and between this and the pain seated in the abdomen there was no apparent connection.

It is difficult to assign any date for the slough in the left lung, and the commencement of the pleuritic effusion. It is certain that these did not exist when he was first seen by me. At no time was there any sudden increase of, or alteration in the symptoms, such as would, in ordinary cases, arise from commencing pleuritis. Four days before death I am satisfied that the effusion, if it existed, was not extensive; and I entertain no doubt that a considerable amount of the effusion must have occurred within two days of death.

In the 'Medical Gazette' for Nov. 10, 1843, I published a case in which a very small slough, at the posterior part of the left lung, had given rise to pleurisy with extensive effusion and pneumothorax. Three days before that on which the presence of air and serum in the pleura was detected, there had been no more marked symptoms of disease in the lungs than those which were observed in the case just related; *i. e.* slight sibilus and rhonchus; and yet, in those three days, air had been admitted into the cavity of the chest, through the gangrenous perforation in the lung; and pleuritis, with extensive effusion, had occurred without any symptoms arising which had attracted the attention of the patient or his attendants. There had been no pain, no uneasiness, no acceleration of the circulation or respiration, no fever, no unusual position in bed,—in short none of the prominent symptoms which usually attend such cases. We cannot, therefore, doubt the possibility of the changes in the chest which were observed in the case of W. W—, just related, having all occurred within a few days of death; and that such change may take place in very debilitated subjects, without giving rise to constitutional disturbance, local pain, or any great disorder of the respiration, must be well known to every careful observer of disease.

In the case last mentioned there were adhesions so

situated, that healthy respiration could be heard in the upper and anterior part of the chest as low as the seventh rib, whilst the unequivocal sounds of pneumothorax were confined to the anterior parts below that rib, in whatever situation the patient might be placed; recumbent, upright, on either side, or bending forwards.

There was a peculiarity in the line of adhesion between the costal and pulmonary pleuræ, in the case of W. W—, which I have seen in three other cases. It commenced behind the apex of the lung, and extended obliquely forwards, until, at the diaphragm, it was about half-way between the ensiform cartilage and the spine. All the pleura, posterior to this line of adhesion, which may be roughly estimated at one third of the entire membrane, was thickly coated with granular lymph; all the membrane anterior to this line was perfectly healthy. Looking to the position which the patient constantly maintained in bed, this line of adhesion must have been nearly horizontal; and it appears probable, that the effusion into the pleura was not, in the first instance, limited by previously existing disease, but that the fluid had gravitated to the posterior part of the chest, and that adhesions of the pleuræ, at the margins of the fluid, had subsequently taken place.

Only one of the three cases in which I have observed similar morbid changes was seen by me during life. The man was under the care of a surgeon for a tumour in the neck, and confined to his bed, where he lay almost constantly on his back. I was asked to see him, on account of his respiration having been observed to have become short and rapid, but the man made no complaint; and it was only after he had been closely questioned, that he made mention of pain on the lower part of the right lumbar region, which he thought was rheumatism, as it did not distress him when he kept quiet. On examining the chest, the symptoms were almost the same as those observed in W. W—, two days before death. Puerile respiration on one side; on the other side, rather feeble respiratory sounds, and diminished resonance over the anterior half of the chest; dullness on

percussion and very feeble respiratory sounds over the posterior half. The man died the next day. In this case there was no disease of the lung; but the morbid appearances in all other respects, so far as the chest was concerned, were so similar to those observed in the case of W. W—, that I do not think it necessary to describe them.

Before concluding this paper, I will briefly notice two other cases in which there were all the symptoms which are usually enumerated as indicative of pleuritic effusion, excepting the absence of respiratory sounds; in both, feeble sounds could be heard on almost every part of the right (the suspected) side. In the first of these cases, there was reason to suspect tubercles in an early stage; but there had been symptoms of pleurisy five weeks before I saw him. He lived nine weeks afterwards. After death, the costal and pulmonary pleuræ were found adherent in all directions, so as to divide the cavity into about twenty compartments, many of which communicated freely with each other. The symptoms of effusion, minus the loss of respiratory sounds, were in this case easily explained.

In the other case, the patient passed from under my care before he died, and no *post-mortem* was made; but, whilst he was under me, the pleura was punctured three times, in three different situations, in consequence of bulging and fluctuation in the intercostal spaces.

At the first operation 16 oz. of pus escaped; at the second about 5 oz.; at the third a still smaller quantity. In this case there can be little doubt there were adhesions dividing the sac of the pleura into distinct cavities, and keeping portions of the lung in contact with the parietes of the chest.

Notwithstanding the number of cases which have been related of unusual and complicated morbid changes in the viscera of the chest, necessarily causing doubts, difficulties, and errors in forming a diagnosis, I believe there are some novel features in those which I have related; and in that belief I have offered them to the consideration of the Society.

CASE OF

POPLITEAL ANEURISM

TREATED BY COMPRESSION,

WITH SOME REMARKS UPON THIS METHOD OF TREATING ANEURISM, AND A LIST OF THE CASES IN WHICH IT HAS BEEN EMPLOYED IN DUBLIN.

BY

O'BRYEN BELLINGHAM, M.D.

FELLOW OF, AND MEMBER OF THE COURT OF EXAMINERS OF, THE ROYAL COLLEGE OF SURGEONS IN IRELAND, SURGEON TO ST. VINCENT'S HOSPITAL, ETC., ETC.

COMMUNICATED BY

SIR BENJAMIN BRODIE, BART., F.R.S.

Received February 7th.—Read June 10th, 1851.

CHARLES MAHER, æt. 42, a labourer from the county of Carlow, was admitted into St. Vincent's Hospital, under the care of Mr. Bellingham, Nov. 26th, 1850, labouring under popliteal aneurism on the right side. He states that he was formerly in the army, and served eight years in the 19th Regiment of Infantry, three of which were spent in the West Indies. He enjoyed very good health, with the exception of an attack of dysentery, under which he suffered there; he was discharged ten years ago, owing to defective vision, caused by some opacity of the cornea of the right eye. He has been engaged since then in agricultural labour; latterly, his employment has consisted in spade labour, in deepening the bed of a river, in a hard soil, where he was sometimes up to his knees in water. He attributes the disease to this work, the right lower extremity being prin-

cipally employed in it; he says he never received a strain, or other injury.

He states that, in June last, he first began to feel pain, which was referred to the centre of the sole of the right foot; that about a month afterwards, the limb swelled from the ankle to the knee, and became nearly double the size of the other, accompanied by cramp in the leg and pain in the ham, which he observed to be fuller than the other. About three weeks ago, he noticed the pulsation for the first time; he continued to work up to a week ago; and has made several applications to the part, among the rest a blister, with the hope of relief. He then applied to a medical man, who recommended him to come up to Dublin to be treated, as he could not afford to lie up in the country.

The popliteal region of the right limb is occupied by a tumour, which has a very strong and heaving impulse, both posteriorly and laterally, elevating the head when the stethoscope is laid on it; on pressing upon the artery in the groin, the pulsation ceases, and the tumour collapses in a certain degree; and, on auscultation over it, a short, harsh, *bruit de soufflet* is heard. The tumour completely fills the popliteal space, is about the size of an orange, measuring three inches from above downwards, and three inches and a half transversely; the ham-string tendons are much stretched, and the integuments covering it are discoloured from the effects of a blister which had been applied in the country. The limb, at this part, measures fifteen inches and a half in circumference, the opposite limb, at the same point, fourteen inches. The limb, from the ham downwards, looks to be somewhat larger than the other; and, on measurement at the calf, is found to be fourteen inches and a half, while on the other side it is only thirteen inches and a half. He is a stout and muscular man; his general health very good; the action of the heart regular; no increased impulse; pulse 64, strong.

November 30th.—The patient was directed to remain constantly in bed, to take half a drachm of the Pulv. Jalap.

Comp. every night, and to be restricted to the following diet:—

Two ounces of bread and two ounces of milk for breakfast.

The same for supper.

Two ounces of bread, two ounces of milk, and two ounces of meat for dinner.

December 3d.—The patient has not exceeded, so far as I can learn, the dietary prescribed; he makes no complaint, except of thirst, and of it only when questioned. The pulse is smaller and softer, and the limb at the site of the aneurism has diminished half an inch in circumference.

4th.—Compression commenced to-day, at 11 o'clock, a.m., by means of two instruments, one upon the artery as it crosses the horizontal ramus of the pubes, the other at the lower third of the thigh; the pulse at this time being soft, small, and compressible, and beating only 56 in the minute. Little congestion of the limb was caused by the pressure; and the sac became, in a great measure, flaccid. The compression was maintained during the day, so as to check pulsation in the tumour; at each visit to the patient, however, a considerable impulse was felt in it, as he could not tell when the pulsation was checked; and in the slight movements in bed, the artery slipped from under the pad.

Half-past eight o'clock, p.m.—The aneurism does not collapse now when the pressure is maintained, but its outlines can be distinctly felt; the patient's skin is cool; he makes no complaint of pain, but says he is very thirsty; and he was allowed a little whey. The patient by this time appeared to understand the object of the compression, and could tell when the pulsation in the tumour was checked; the management of the compressing instruments was, therefore, left to him during the night, and he was directed to alternate the points of pressure whenever pain was experienced, and not to allow any impulse in the aneurism. I had, I should have observed, marked with ink, upon the patient's thigh, the points upon which he was to keep the pad of the compressing instruments, and this part of the limb was directed to be dusted occasionally with flour.

5th.—The patient remained awake during the night, and says that he continued the pressure so as not to allow any pulsation in the aneurism during the night. At the hour of visit this morning (between nine and ten o'clock), on unscrewing the instrument, the pulsation of the aneurism was found to have ceased, and the tumour was hard, solid, and circumscribed. An enlarged collateral vessel, running down the centre of the popliteal space, was felt faintly beating low down in this part; the enlarged articular arteries about the knee were not felt, and the patient had experienced no pain about the joint or in the leg. He was directed to remain in bed, and to continue moderate pressure.

10th.—The compressing instruments have not been applied for some days; the patient is quite free from pain; and the swelling of the limb perceptible on his admission has diminished. He has been kept in bed, and the diet has been gradually improved, so that he is now nearly upon full diet. The aneurismal tumour is solid and firm, the integuments covering it are loose now, and the ham-string tendons are not stretched as they were. Neither the anterior tibial artery upon the dorsum of the foot, nor the posterior tibial can be felt, nor is the pulsation of the articular arteries about the knee perceptible; the only vessel felt being a branch which runs over the centre of the popliteal space.

17th.—The patient has remained in bed since the date of the last report; he does not suffer the slightest inconvenience, and the tumour has diminished a little in size.

22d.—The patient was permitted to get up to-day; the limb, he says, feels somewhat stiff, and the ankle is slightly œdematous; in other respects he is perfectly well.

January 2d.—The patient feels no inconvenience now of any kind; the aneurismal tumour is hard, solid, and smaller. In order to promote absorption, he was directed to rub the ham with the ointment of hydriodate of potass, to which a little mercurial ointment was added.

28th.—The patient returned to the country to-day; the limb is as strong as the other; and his general health is very good.

This makes the thirty-sixth case of external aneurism, treated by compression, in Dublin, between the years 1843 and 1850 inclusive, as will appear from the following table, containing a list of these cases; in which, under separate heads, I have given the situation of the aneurism, the hospital or other locality where the patient was treated, the name of the surgeon who had the management of the case, the result, and the name of the journal in which the case was published, with some observations in reference to the subsequent history of these patients.

List of Cases of Aneurism treated by Compression in Dublin between the years 1843 *and* 1850.

No.	Seat of disease.	Where treated.	Surgeon's name.	Result.	Where published.	Observations.
1	Popliteal	Richmond Hospital .	Mr. Hutton	Cured	Dublin Medical Press	
2	Popliteal	Steeven's Hospital .	Mr. Cusack	Cured	Dublin Medical Press	
3	Popliteal	St. Vincent's Hospital	Mr. Bellingham	Cured	Dublin Medical Press	
4	Popliteal	Jervis-street Hospital	Mr. Harrison	Cured	Report of the British Association	
5	Femoral	St. Vincent's Hospital	Mr. Bellingham	Cured	Dublin Medical Press	Nos. 3 and 5 refer to the same patient; the aneurisms were seated in opposite limbs. The patient has since died of aneurism of the aorta, and the femoral and popliteal arteries are preserved in the Museum of the Royal College of Surgeons, Dublin.
6	Popliteal	Jervis-street Hospital	Mr. Kirby	Cured	Dublin Medical Press	
7	Popliteal	At patient's residence	Mr. Cusack	Cured	Dublin Medical Press	Patient has since died of cerebral disease.
8	Popliteal	Meath Hospital . .	Mr. Porter	Cured	Dublin Quarterly Journal	
9	Popliteal	Steeven's Hospital .	Mr. Cusack	Cured	Dublin Medical Press	This patient died suddenly of disease of the heart, forty-eight hours after the pulsation of the aneurism had ceased.
10	Popliteal	Not stated	Mr. Porter	Cured	Dublin Quarterly Journal	This patient has since died of aneurism of the aorta. The preparation is preserved in the Museum of the Royal College of Surgeons, Dublin.
11	Popliteal	Richmond Hospital .	Mr. Hutton	Artery tied, recovered	Report of Surgical Society, Dublin Medical Press	Compression was employed for a time and given up. The artery was tied by Dr. Macdonnell.
12	Popliteal	St. Vincent's Hospital	Mr. Ferrall	Cured	Dublin Hospital Gazette	

13	Popliteal	Richmond Hospital .	Mr. Macdonnell	Cured	Dublin Medical Press	This patient had been operated upon some years previously for popliteal aneurism on the opposite side.
14	Brachial	Steeven's Hospital .	Mr. Cusack	Cured	Unpublished	
15	Popliteal	Steeven's Hospital .	Mr. Cusack	Cured	Dublin Quarterly Journal	
16	Popliteal	Military Infirmary, Phœnix Park.	Mr. Humfrey	Cured	Dublin Medical Press	
17	Popliteal	St. Vincent's Hospital	Mr. Bellingham	Died of erysipelas	Dublin Medical Press	Galvano-puncture was combined with compression in this case. A week afterwards the patient was attacked with erysipelas and died.
18	Popliteal	St. Vincent's Hospital	Mr. Ferrall	Cured	Dublin Quarterly Journal	
19	Popliteal	Adelaide Hospital . .	Mr. O'Brien	Cured	Dublin Medical Press	Nos. 19 and 20 refer to the same patient. The aneurisms were seated in opposite limbs. Pressure was employed for a time in the second aneurism, but the patient was unable to continue it, being obliged to return to his employment. The aneurism is now, after an interval of three years, small, and its pulsation feeble. The patient is now the subject of aortal aneurism.
20	Popliteal	At patient's residence	Mr. Bellingham	Pressure discontinued	Unpublished	
21	Femoral	Military Infirmary, Phœnix Park.	Mr. Humfrey	Cured	Dublin Medical Press	
22	Popliteal	At patient's residence	Mr. Tufnell	Cured	Dublin Medical Press	
23	Popliteal	Steeven's Hospital .	Mr. Cusack	Cured	Dublin Quarterly Journal	
24	Brachial	City of Dublin Hospital	Mr. Orr	Artery tied, recovered	Dublin Medical Press	A case of aneurism following venesection. Pressure was used without success. Two vessels required ligature.
25	Popliteal	At patient's residence	Mr. Tufnell	Cured	Dublin Medical Press	
26	Brachial	Richmond Hospital .	Mr. Hutton	Cured	Dublin Medical Press	

No.	Seat of disease.	Where treated.	Surgeon's name.	Result.	Where published.	Observations.
27	Popliteal	Not stated	Mr. Hutton	Cured	Dublin Medical Press	
28	Femoral	Military Infirmary, Phœnix Park.	Mr. Fox	Limb amputated, recovered	Dublin Medical Press	On examination of the limb, the artery was found to be torn across at the site of the aneurism.
29	Radial	At patient's residence	Sir P. Crampton	Cured	Dublin Medical Press	
30	Popliteal	Jervis-street Hospital	Mr. Banon	Cured	Dublin Medical Press	
31	Femoral	City of Dublin Hospital	Mr. Tufnell	Cured	Unpublished	Nos. 22, 25, and 31, refer to the same patient.
32	Femoral	Meath Hospital . .	Mr. Smyley	Cured	Dublin Medical Press	This patient remained well for three years, when he died suddenly, probably of internal aneurism, but no post-mortem examination was made.
33	Popliteal	Military Infirmary, Phœnix Park.	Mr. Clayton	Limb amputated, recovered	Unpublished	Pulsation ceased after compression had been employed for a time; it then returned, and the sac enlarged rapidly, when the limb was amputated.
34	Femoral	City of Dublin Hospital	Mr. Hargrave	Cured	Unpublished	This and No. 14 are the only cases in the list in which the disease occurred in the female.
35	Po pliteal	Mercer's Hospital . .	Mr. Read and Mr. Butcher	Died of pulmonary disease	Unpublished	The aneurism in this case was large, had formed rapidly, and threatened to become diffused. The patient died of bronchitis and tubercular disease of the lungs.
36	Popliteal	St. Vincent's Hospital	Mr. Bellingham	Cured	Unpublished.	

The foregoing table contains a list of *all* the cases of popliteal or femoral aneurism, treated by compression, in Dublin, during the last seven years. It includes, also, I believe, every case of aneurism in these vessels, admitted into the Dublin Hospitals, or treated in Dublin within that period, with the exception of four; viz., a case of femoral aneurism where compression was not employed at all, and the artery was tied with success; a case of large popliteal aneurism, where the sac had formed a communication with the knee-joint, and the limb was amputated; a case of traumatic aneurism high up in the femoral artery, where the vessel was tied with success; and a case of varicose aneurism in the thigh, to which neither compression nor the ligature was adopted.

The table has been limited to the cases treated in Dublin, partly because the practice may be said to have originated there, and, without intending anything disparaging to other places, or other surgeons, is perhaps best understood there; and the most improved instruments for making compression have been employed there. It appeared to me, likewise, that the value of this method of treating aneurism would be best illustrated by a table of the Dublin cases, because these were not selected cases, but almost every patient labouring under popliteal or femoral aneurism, admitted into the hospitals in Dublin, since the year 1843, has been treated by compression. Besides, it was from Dublin alone that I could give a list of all the cases which came under treatment during the period in question; or, that I could vouch for the accuracy of the details, or for the permanence of the cures, which I am enabled to do, as I had the opportunity of seeing the majority of the cases given in the table, while under treatment; of assisting in the treatment of some of them; and of examining the diseased parts, either when the patient died subsequently, or when amputation of the limb was had recourse to.

This list, it will be observed, includes 32 cases of popliteal and femoral aneurism, viz., 6 of femoral and 26 of popliteal aneurism, 3 cases of brachial, and 1 of radial aneurism.

Of the 3 cases of brachial aneurism, 2 were cured by compression; in the third a high bifurcation of the brachial artery existed, and when the operation came to be performed two vessels required to be tied: all three were examples of traumatic aneurism. The radial aneurism was also an example of traumatic aneurism, and was cured by compression. Of the 6 cases of femoral aneurism, 5 were cured by compression; the sixth was a case of diffuse aneurism, in which the ligature would equally have failed, and in which amputation of the limb was the only resource.

Of the 26 cases of popliteal aneurism, 21 were perfectly cured; one of them, however, (No. 9,) died, as I have observed, suddenly, owing to organic disease of the heart, forty-eight hours after the cessation of pulsation in the aneurism. Of the remaining five cases, one (No. 20) was unable to continue the compression, being obliged to return to his employment; and now, after an interval of three years, during which the patient has been constantly occupied in a laborious employment, he has never suffered any inconvenience from it; the tumour is smaller, and its pulsation more feeble. In another (No. 11), compression was discontinued, and the artery tied, the patient recovering. In a third (No. 17) galvano-puncture was combined with compression; the patient soon afterwards was attacked with erysipelas in a very severe form and died. In a fourth (No. 33) the aneurism enlarged considerably, pressure having been discontinued, and the limb was amputated. And in the fifth (No. 35) the patient died of pulmonary disease, and the aneurism, on examination after death, was found to be in a great measure filled up by fibrin. I may add, that the only two cases in the list in which amputation was performed, occurred in a military, not a civil hospital, where the treatment was of course conducted by the military medical officer, temporarily in charge.

In three of the cases in this list, (Nos. 3 and 5, 19 and 20, and 22, 25, and 31,) the patients underwent the treatment by compression for aneurism in opposite limbs, one of them was treated three times, viz., twice for popliteal aneurism in

opposite limbs, and once for femoral, each time with success. One of the patients (No. 13) had undergone the operation by ligature for popliteal aneurism in the opposite limb, some years previously. Four of the patients in this list (Nos. 3 and 5, 7, 10, and 32) have since died, two of aortal aneurism, one probably also of internal aneurism, and one of cerebral disease; another[1] (No. 19 and 20) is at present labouring under aneurism of the aorta. Only two of the patients in the foregoing list (Nos. 14 and 34) were females.

When compression first came to be employed in Dublin as a mode of treating aneurism, it was objected that the disease would be liable to return: in no case, however, marked *cured* in the forgoing list has any thing of the kind occurred; the cure in all has been permanent, and the patients have gained the perfect use of the limb. Indeed, from the manner in which compression brings about the cure of aneurism, it is clear that the disease cannot return in the same part of the vessel, and, in the opportunities which I have had of examining the parts some time subsequently, owing to the patient's death from other causes, the artery has invariably been found to be obliterated at the seat of the aneurism, and converted into an impervious, ligamentous band at the part; while the portion of the artery upon which pressure had been made, preserved its normal condition, and neither it nor the vein (which, from its proximity to, and close connection with the artery, must always, in cases of femoral or popliteal aneurism, be compressed with the artery,) presented, in a single instance, any deviation from the normal and healthy state.

When we contrast the results of the treatment of aneurism by compression, with the results of the ligature in aneurism of the same arteries, as furnished by the most recent statistical tables, the comparison appears very favorable to compression: thus, the table which I have given contains 36 cases; in 29

[1] This patient has since died, and I had the opportunity of making an examination of the limbs.

a cure was effected by compression; of the remaining 7 cases the artery was tied in 2, the patients recovering. In 1, pressure was discontinued, the aneurism subsequently diminished in size, and the patient had the perfect use of the limb for three years, when symptoms of aneurism of the aorta supervened, and compelled him to give up his employment. In 2, the limb was amputated, the patients recovering; and in the remaining two, death occurred, in one from pulmonary disease, in the other from a severe attack of erysipelas; but in both, the local disease was very nearly cured, the aneurismal sacs being almost completely filled by fibrine deposited in concentric layers.

If we now turn to the statistics of the ligature, furnished by the most recent statistical tables, the results appear much less satisfactory. Thus, in a table given by Dr. Norris in the 'American Journal of Medical Science,' 188 cases where the femoral artery was tied for aneurism are reported, (in 155 for popliteal aneurism,) and the following are the results:—

No. of cases.	Cured.	Died.
188	142	46

The majority of the deaths was owing to gangrene, secondary hæmorrhage, phlebitis, tetanus, &c.; while six of the patients who recovered underwent amputation of the limb.

Another table is contained in Mr. Crisp's 'Treatise on the Diseases of the Blood-vessels.' This includes 119 cases of popliteal aneurism treated by the ligature, with the following results:—

No. of cases.	Cured.	Died.
119	103	16

The deaths were the result of secondary hæmorrhage, gangrene, phlebitis, tetanus, delirium tremens, the shock of the operation, and suppuration in the sac. Six of the patients under the head "*cured,*" underwent amputation of

the limb after the ligature; and six others recovered, notwithstanding the occurrence of gangrene, secondary hæmorrhage, or suppuration in the sac.

The summary of the results of the ligature, in the cases of popliteal and femoral aneurism, contained in these tables, would appear to be even too favorable to the ligature. The same cases are included in both; and it is evident that they can form only a moiety of the cases of aneurism of these vessels, in which the ligature has been used, during the period in question, (fully half a century.) When we consider, in addition, with what unwillingness cases which turn out unfavorably are published, it seems highly probable, that, if we were in possession of full statistics of all the operations for aneurism performed upon these vessels, the per centage of deaths would be found to be much greater. Even taking the statistics of the ligature as we find them, if we contrast its results with that of compression in the same forms of aneurism, we perceive a remarkable immunity from risk, in the one method of treatment, and a considerable amount of risk attending the operation in the other. Thus, the great majority of the deaths after the ligature were owing to secondary hæmorrhage, gangrene, phlebitis, tetanus, and delirium tremens, in other words, directly to the result of the operation; while in the treatment by compression, all those accidents were avoided, not one of them having occurred in the thirty-six cases contained in my table. The two deaths in it were, I may say, from causes independent of the treatment; the one having been from erysipelas, which was prevalent in the hospital at the time; the other from pulmonary disease. Both were likewise men of broken-down constitutions, with diseased heart and arteries; very unfavorable subjects, consequently, for operation, and in whom, if the ligature had been used, it would most probably have proved a failure.

Although compression has proved eminently successful in Dublin, as a mode of treating certain forms of aneurism, and has so completely superseded the ligature there, that

the latter has not been had recourse to for several years past in a single case of popliteal aneurism, either in hospital or in private practice, it must be confessed that the reports from most other places are less favorable; it is therefore scarcely unreasonable to conclude that compression cannot have been employed in the same way, that equally effective instruments cannot have been used, or that the same precautions cannot have been taken to ensure success. Indeed, a perusal of the cases which have been published of the failure of compression in the hands of surgeons out of Dublin, (which have been put so prominently forward in some places) has satisfied me, that the failure in the majority resulted either from the imperfection of the instruments employed, from an unnecessary degree of pressure having been used, or from its having been made in an imperfect manner, from tight bandages having been applied to the limb while pressure was maintained upon the main artery, from the treatment having been commenced without due attention to constitutional measures, or finally from compression having been used in cases where the ligature would equally have failed.

It is unnecessary to say that compression is not employed at the present day with the object of endeavouring to obliterate the artery at the point compressed, if it were, few patients would have been found possessed of the fortitude to submit to the pain such an amount of pressure would occasion. I do not, however, mean to assert, that compression is a painless process; but I do say that the pain may be much increased, and that the patient may be, and often has been, put to a great deal of unnecessary pain, and may refuse to continue its use from this cause alone.

I do not wish it, either, to be supposed that compression is advocated in every form of aneurism, or that it is supposed to be capable of effecting a cure in every variety of the disease, as, for instance, in diffused aneurism, or where the aneurismal sac had been allowed to attain an extremely large size, or where the sac of a popliteal aneurism had formed a communication with the knee joint, or had caused

erosion of the bone; in fact in cases where amputation is perhaps our only resource.

Compression, as a mode of treatment in aneurism, is advocated mainly as a substitute for the ligature, and for cases to which the ligature is applicable, provided the sac is so situated that compression can be made upon the artery at its cardiac side, as well as for cases where the arterial tunics are diseased, and the ligature would be consequently very likely to fail. It is advocated because pathology has shown that it brings about the cure of aneurism by the very mode in which nature, under the most favorable circumstances, effects this object, and because experience has proved it to be a safe and certain method of treatment, while all experience has shown the ligature to be directly the reverse.

If we expect, however, to be successful, and if we hope to effect a cure speedily, our efforts must be mainly directed to the means whereby pressure may be maintained with as little inconvenience as possible to the patient, which will depend in a great measure upon the kind of apparatus used, and its completeness; upon the manner in which the pressure is maintained; and, upon the constitutional measures adopted previous to the treatment being commenced, and while it is in progress.

A good deal will also depend upon the intelligence and tractability of the patient. In a mode of treatment which usually occupies several days, and sometimes more, it is not easy to have a constant surveillance; and if the patient unscrews the instrument the moment the surgeon's back is turned, the cure must of course be retarded; or, if he is too stupid to understand the manner of using the compressing force, or the object with which it is applied, the pressure will be imperfectly maintained, and at each visit the surgeon will probably find the pad of the instrument resting upon any other part than the artery.

With respect to the instruments, I need only observe that those which are available now, are in many respects superior to those we were in possession of a few years ago, the un-

yielding force of the screw has been superseded by the elastic force of the vulcanized India-rubber bnads, an improvement for which we are indebted to Dr. Carte; the treatment, consequently, has been much simplified, and the pressure can be borne with less inconvenience by the patient. While upon this point, I may observe that it is scarcely doing justice to this method of treating aneurism, to undertake it without being provided with a proper apparatus for carrying it out; yet this would appear not unfrequently to have occurred in the trials of compression made in other places, and these very cases have been afterwards published as examples of the failure of compression, and have been made a ground for decrying this method of treatment, while the fault lay, in a great measure, with the surgeon who commenced the treatment without having proper instruments at hand for carrying it out.

In the list which I have given, of the cases of aneurism treated by compression in Dublin, there were few in which the treatment was so quickly successful, and in which the pulsation of the aneurism ceased within so short a period, as in that just detailed. This fortunate result may be attributed, in part, to the constitutional treatment to which the patient was subjected, previous to the application of the compressing instruments, and as this was the first case in which constitutional measures of the kind were combined with the local measures, and as it promises to be an important agent in the treatment, in future, I may be permitted to make a few remarks upon it.

When the patient was admitted into the hospital, his pulse, as I have said, was strong and incompressible. In such a state of the circulation, a much greater amount of pressure would have been found necessary in order to stop the pulsation of the aneurism than was required in his case; greater pain would unavoidably have been inflicted on him, and greater difficulty would have been experienced in maintaining the pressure from this very cause.

With the view of diminishing the hardness and incom-

pressibility of the pulse, bleeding has been sometimes advantageously premised, particularly when the patient was young and plethoric. I was unwilling, however, to bleed this patient, as although muscular and stout, he did not appear to be a favorable subject for the abstraction of blood. I preferred, therefore, adopting a plan of treatment, which I have employed with advantage in some cases of aneurism of the aorta, under the use of which I have found the pulse to become soft, small, and compressible, and its frequency to be diminished. This consists in an extremely restricted diet, especially as respects fluids, the utmost amount allowed being but six ounces in the twenty-four hours, with eight ounces of solid food in the same period, combined with the daily or frequent use of some hydragogue cathartic, the patient being at the same time strictly confined to the horizontal posture.

Under the use of this regimen, continued for some days, the hardness and incompressibility of this patient's pulse diminished and it became slower; the compressing instruments were consequently borne with little inconvenience. At the same time, the watery constituents of the blood being diminished, this fluid became more dense, by which the deposition of its fibrin, in its passage through the aneurismal sac, was favoured; this began early to be deposited, and before twenty-four hours had so much increased that the pulsation of the aneurism ceased. Had compression, on the other hand, been at once commenced without any preparatory treatment, much stronger pressure would have been required; and as the pain is, in some measure, in the ratio to the degree of pressure, this patient would have been subjected to much unnecessary pain while the treatment would unavoidably have been more prolonged.

Although in many of the cases in the list which I have given, compression proved effectual without almost any preparatory treatment, and in none was any, like that adopted here, employed, I am of opinion that it ought to constitute a prominent item in the treatment, tending, as it most certainly does, to diminish the pain which the compressing

instruments occasion, as well as to shorten the period required for their employment. And I am convinced that if in future, constitutional measures analogous to those employed in this case, are made to precede the local treatment, and that the latter is fully and fairly carried out, no case to which compression is applicable will be found to resist, and those who are most sceptical will be obliged to acknowledge its superiority over the ligature.

ACCOUNT OF
THE DISSECTION OF A CASE
IN WHICH
TWO POPLITEAL ANEURISMS
HAD BEEN TREATED BY
COMPRESSION OF THE FEMORAL ARTERIES.

BY

PRESCOTT HEWETT,

ASSISTANT SURGEON TO ST. GEORGE'S HOSPITAL,
AND LECTURER ON ANATOMY, ETC.

Received June 9th.—Read June 10th, 1851.

F. V—, æt. 38, was admitted into St. George's Hospital, under the care of Mr. Cutler, on the 7th of June, 1848, with a tumour in each popliteal space: that on the right side was very large, and completely filled this region; it presented pulsation, expansion, and the bruit usually observed about aneurisms; but the sac, although compressible, could not be emptied. Below the tumour, the limb was slightly œdematous; but the skin, somewhat tense and shining, was natural in colour; handling gave little or no pain. The disease had, it appeared, existed about three months, and when first observed, the swelling was not larger than a plum. No treatment whatsoever had been adopted for it.

The tumour in the left ham was very much smaller, not exceeding the size of a small egg; it was hard, and to a great degree, apparently solid, but pulsation was evident in it, although much less marked than on the right side. The following was the only history which could be obtained from the patient, a foreigner, as to the disease on the left side.

The tumour had first been noticed about eighteen months back, its appearance being speedily followed by great swelling of the limb, which increased to about twice its natural size. Shortly afterwards he went into the Wexford Infirmary, where, by means of an instrument, compression was established on the femoral artery, and kept up, more or less, for seventeen weeks; under this treatment, the limb gradually regained its natural dimensions, and the tumour was reduced to its present size. He then left the infirmary; but the state of his general health was such that he had not been able to undertake any work in his trade, which was that of a musical instrument maker. The tumour in the left ham had presented little or no variation, and had caused him but slight inconvenience. His health had begun to give way about two years and a half ago; he was pallid, and his whole aspect was that of a man suffering from great debility.

At a consultation of the surgeons, it was determined, under existing circumstances, that compression should be applied first upon the right femoral artery, by means of a ring tourniquet, which was so adapted as only to lessen the circulation. In some little time, all œdema of the limb disappeared, and the tumour itself became less in size and firmer, but pulsation still remained evident in it. Some six weeks after the patient's admission into the hospital, and whilst under treatment, he began to complain of cough and expectoration, with some difficulty of breathing. Nothing abnormal was detected about the heart by auscultation, but the lungs were found to be engorged at the back part. He at first appeared to derive some little benefit from the treatment which was adopted, but subsequently the difficulty of breathing and the cough increased much in severity; these symptoms went on without mitigation for about a fortnight, when he one day suddenly brought up a large quantity of arterial looking blood, and died soon afterwards.

At an examination of the tumour made some short time before the patient's death, it was found that there was still some pulsation left, but that the mass had become much firmer and more solid; the ring tourniquet had, it appeared,

for the greater part of the time, only been worn during a few hours daily. No change whatsoever had occurred on the left side.

For the notes of the history of this case, I am indebted to Mr. Richard Blagden, Surgical Registrar to the Hospital.

The body was examined thirty-one hours after death.

On the left side, the aneurismal tumour, deeply imbedded in the popliteal space, was lying between the joint and the artery. Pyriform in shape, with the base downwards, it was about the size of an egg, and appeared to be perfectly solid, but on cutting into it, the lower half only of the sac was found filled with closely packed laminated coagula, very firm, and of a fawn colour; the remaining part of the sac containing only a small quantity of recently coagulated blood, was lined by a perfectly smooth membrane continuous with the internal coat of the artery and of the same colour, except in that part which was stained by the contact of the recent clots. The opening from the sac into the upper part of the artery was a free one, nearly as large as the vessel itself; that leading into the lower part of the artery was a small one, only admitting a common-sized probe; this part of the artery which had been carried backwards and pressed upon by the development of the sac, was itself much reduced in size, but still pervious; its coats were for the greater part healthy, and so were those of the anterior and posterior tibial arteries, which were of their normal size. Immediately above the aneurism, the coats of the artery were extensively thickened by atheromatous deposits, and this diseased appearance, more or less marked, existed also in the lower part of the femoral. In this diseased part of the artery, there were three distinct aneurismal dilatations, about the size of filberts, two in the femoral vessel, and one in the popliteal, half an inch above the larger aneurism. The femoral artery was pervious in its whole length, and at its upper part quite healthy in structure; the femoral vein was also pervious and healthy, and presented no morbid adhesions to the artery; the sheath of the vessels and the surrounding cellular tissue

in the thigh were not thickened. The popliteal vein and nerve were firmly adherent to the aneurismal sac, and so too were some fibres of the gastrocnemius muscle; the nerve was flattened with its fibrils spread over the outer and back part of the tumour. On the right side, the aneurism, somewhat larger than a cricket-ball, was also lying between the artery and the knee, the vessel running down the centre of the posterior surface of the tumour, which was closely united to the joint. The whole of the sac was completely filled with laminated coagula, except at the back part, where there was a small channel, by which the blood might pass from the upper to the lower part of the vessel; the surface of this channel was rough, and recently coagulated fibrin was deposited in it; the opening of this channel into the upper part of the artery was a free one, and lined by a smooth membrane; at the lower part the communication of the channel and the artery was much contracted, this part of the vessel itself being much diminished in size, in fact not larger than the posterior tibial. Above the aneurism, the coats of the vessel were thickened by atheromatous deposits, and here, too, about an inch and a half higher up, there was another aneurismal dilatation as large as a nut. Patches of atheroma existed also in different parts of the femoral, but this vessel was otherwise healthy and pervious in its whole length. The femoral vein was also healthy and pervious, and not more adherent, in any part of its course to the artery, than natural; the surrounding cellular tissue was healthy. The popliteal vein and nerve here presented the same appearances as those observed on the left side, being displaced and adherent to the back part of the sac, which, towards its outer side, was covered with the expanded fibrils of the nerve. Some of the muscular fibres of the gastrocnemius were so adherent to the sac, that they could not be removed without destroying its walls.

In the chest, some old adhesions were found in the pericardium, but the heart and its vessels presented nothing remarkable. The aorta was extensively affected with atheroma throughout a great part of its course; and so,

too, were the three large vessels arising from its arch, which generally was somewhat dilated. Three distinct aneurisms existed in this part of the vessel; the smallest, of the size of a cob-nut, was situated at the point of origin of the brachio-cephalic artery, involving a part of this vessel; no coagula were found in it. The second, as large as a walnut, and situated on the concave portion of the arch, nearly corresponding to the first one, passed forwards, partly overlapping the pulmonary artery and adhering to it; its opening, of the size of the little finger, was perfectly smooth, as if lined by the internal coat of the artery, and its cavity was partially filled with coagula. The third, and largest of the three, which was situated at the back part of the artery, immediately behind the origin of the large vessels, had made its way upwards between them and the windpipe, to which it was firmly and extensively adherent; its opening was a free one, and its cavity partially filled up by coagula of some standing; at the back part of the sac there was a small ulcerated opening leading into the windpipe, about an inch above its bifurcation, through which the fatal hæmorrhage had taken place. In the air-tubes were found clots of recently coagulated blood; in addition to which the lungs themselves presented several well-marked patches of pulmonary apoplexy; both these organs were extensively affected with emphysema.

In the abdomen all the organs were healthy, excepting the kidneys, which were somewhat smaller than natural, and rough on their surfaces, with several small cysts in their structure.

ON

THE RELATION OF SLEEP

TO

CONVULSIVE AFFECTIONS.

BY

WILLIAM FREDERICK BARLOW, M.R.C.S.

RESIDENT MEDICAL OFFICER TO THE WESTMINSTER HOSPITAL.

Received February 5th.—Read April 8th, 1851.

THE relation of Sleep to Diseases in general is a subject still needng full investigation; and that which it holds to Convulsive Affections would be found especially worthy of research. The *history* even of the spasmodic disorders which occur in sleep is so meager and unsatisfactory, that one more accurate and ample is required; but as the facts which illustrate it are for the most part common, I will confine my observations to some points respecting the *causes* of the convulsions which happen either in light or profound repose.

Sleep produces certain peculiar states, both of body and mind, which must have a most considerable connection with convulsive maladies; and I would beg the particular attention of the Society to—

I. The condition of the Circulation and Respiration.
II. To that of the Motor Force and Muscular Irritability.
III. To the Emotions of Dreaming.
IV. To the withdrawal of the Will.

I. *Of the state of the Circulation and Respiration.*—I will not here consider whether sleep itself may not be a consequence of cerebral congestion falling short of that which

would give rise to coma; but there is every reason to believe that the vessels of the brain are fuller at that period than in wakefulness. It may even be concluded that they are *necessarily* so from the position of the patient, and the state of the respiration. There is sometimes during sleep plain evidence of congestion; the face is flushed, the conjunctivæ are reddened, the veins of the neck and temple are turgid, the countenance looks occasionally swollen, the lip is somewhat livid, the pulse labours, the breathing is heavy, or even stertorous. We may be certain that the state of the vessels external to the brain is, more or less, a guide to that of those within. Through the cerebral circulation being impeded, the brain may so mechanically irritate the spinal cord as to lead directly to convulsive actions. That circulation is apt to be unusually disturbed, if sleep be preceded by unusual bodily or mental excitement, by a luxurious or immoderate meal, and by the emotions of dreaming, whencesoever arising; and whatever its difficulties, the helpless condition of volition is such that it cannot be assisted through the respiration, as in wakefulness.

II. *Of the Increase of the Motor Force and Muscular Irritability.*—It may be assumed that, in many who are predisposed to convulsions, spasmodic affections partly happen from the renewal and increase of the motor force which take place in sleep. Some phenomena of hybernation, and some, too, observable in paralytic limbs cut off from cerebral but not spinal influence, show well how irritability is fed by stillness; and it would be futile to deny, that liability to spasm, of every kind, is, *cæteris paribus*, in direct ratio of the measure of the motor force. During wakefulness this force must be continually lessened, and kept in check by expenditure carried on in some form or other; but in repose its augmentation may become dangerous in subjects liable to convulsion. Whatever be the cause which immediately excites it to unruly action, its own quantity or intensity must be well considered. We cannot too clearly regard this force as dependent on and modified by the

blood's condition, as all secretions are; and it is not more the office of the glands, each after its kind, to separate their fluids, than it is the vital function of the spinal cord, through the replenished vessels it abounds with, to supply unfailingly the motor power, whereof there is not only a different measure in sleep and wakefulness, but a superfluity in childhood, and a deficiency in age, whilst in some diseases it is as much below, as in others it is above, the demands of the system. I say nothing of idiosyncrasies, which would reward inquiry. Sleep may most manifestly be so indulged as to confirm or cause spasmodic affections. The vast amount of time consumed in it by infancy and childhood, wherein prevails frequently a most perilous excitability, calls for attention. Coma is fairly, in some of its consequences, comparable to an extraordinarily protracted repose, and may bring on, as I have frequently noticed in young children, so morbid a susceptibility of spasmodic action, that the slightest touch or a drop of water will reflexly excite general convulsions.

III. *The Emotions of Dreaming.*—These are, very probably, amongst the most common immediate causes of the convulsions of sleep; and this we should be justified in suspecting from the marked effect of emotion in epilepsy, laryngismus stridulus, and other forms of spasmodic malady during the waking state.

It is needless to enter at any length into the intense horror which dreams may occasion; all must have felt it; but in childhood they are singularly pertinacious and terrible, and may partly explain the frequency of convulsions at that time of life. Nor does the danger cease at the moment of awaking, for spectra are prone to linger and agitate.

I have frequently watched the quiverings of the muscles and the starting of the limbs in dreams, which I regard amongst the most frequent of all the causes of convulsive action. The dreams of epileptics have been pointedly referred to by Aretæus; and they have often a most unhappy influence on their dreadful disorder, breaking the sleep with

frightful paroxysms, and in some instances deferring by terror the time of its approach.

Emotion, speaking generally, has never so much dominion as in sleep, wherein the restraining power of volition is withdrawn, and there is a kind of general paralysis, attended commonly with high irritability, which extremely favours its inordinate play. Even the healthiest and strongest men are appalled by, and tremble from, the frightful and fantastic visions of their sleep; but to judge rightly of the effect of emotions in dreams, we must place fully before us the various conditions in which they have to act. The epileptic is oftentimes so excessively excitable that there is a risk of the slightest impressions. The young subject of laryngismus stridulus is as irritable occasionally as a sensitive plant; not a change of mind or body but acts with unusual and morbid violence. In tetanus or hydrophobia no impression is trifling. The limbs of the paralysed are now and then noted to be convulsed by a touch.

Dreams are, for the most part, referable to excitement of mind previous to sleep, to immediate impressions on the nervous system, to changes of the blood, and to various impeded or embarrassed conditions of the respiration and circulation. It would be well to subdivide this outline minutely, and to treat at length of their origin, which, well considered, would be found to illustrate much that is obscure in nervous pathology. The resemblance which exists between dreaming and delirium, extends somewhat to their causes. Both are oftentimes referable to impressions on the sentient nerves. A sensation too obscure to awaken is very likely to produce dreaming; violent or long-continued pain, especially if it happen in exhausted subjects who have been long sleepless, is very apt to be the origin of delirium. The state of volition is intimately connected with both instances, and throws equal light upon each; if it be suspended, or almost so, in the one, it may become so weakened and languid in the other, as to lose all effectual control over the operations of the mind. Delirium must be regarded as a source of convulsion; therein, as in dreaming, the emotions rise sometimes to their highest pitch.

It is occasionally not a little hard to say if a person be delirious or dreaming; the best test will be found in the endeavour to rouse him completely, and noting the effect of wakefulness on his delusion. During typhus there is often a prolonged dream, the will of the patient being as much withdrawn from directing his mind as from governing his muscles; and be it remarked that this condition may be commonly enough quite dispelled by fully rousing him. I watched but lately a young man dangerously stricken with typhus fever whilst he lay in unsound sleep. There was a lively quivering of the muscles of the face, particularly of the orbicularis oris. At one time it affected half, at another both sides of the countenance; the hands were in frequent tremor, and now and then the forearm was jerked abruptly. I imagine a dream was disturbing him. On my perfectly awaking him, and his will becoming active, all these movements ceased; but they returned the moment he relapsed into slumber.

In considering the relation of sleep to spasmodic movements, it must always be inquired, as a matter of course, whether it be sound or not. In truly sound sleep, chorea no longer waywardly agitates, and paralysis agitans ceases to shake, and many forms of local affections of the motor force find temporary quiet; but not so if the slumber be ruffled by emotions. I observed of a patient with mercurial erethism, that whatever agitated his mind disturbed also his body; the mere question of a stranger would make his muscles quiver. I watched his sleep; then he was often in perfect rest; but at other times he startled occasionally, and seemed to be dreaming when he did so.

The opposite influence of calm and disturbed sleep is clearly instanced by the following observation. A woman was affected with an almost perpetual tremor of the right arm and hand, which was extremely aggravated by emotion. I carefully noted that the arm and hand were completely still during perfectly sound sleep; but in imperfect or light repose there was a varying amount of tremor. The hand, no less in sleep than in wakefulness, became a delicate index of the condition of the mind. One night, when the patient

was resting profoundly, I examined the hand as it lay by her side; not a muscle quivered; but shortly afterwards the slumber became manifestly imperfect, and then the hand and arm, influenced as it seemed by the emotion of dreaming, shook very forcibly. On a subsequent night I watched more minutely, and for a longer time. In calm sleep the hand lay in perfect rest, but anything which disturbed the repose served also to renew the tremblings. When it became very violent, she occasionally seemed about to awake, and even performed a voluntary act or two, and made a kind of complaining noise, as though annoyed by something; but instead of arousing completely, she relapsed gradually into her former complete unconsciousness, the slow subsiding of the tremors well marking its return. And so she would lie, without any movement of the voluntary muscles, the arm participating in the perfect quiet, until a noise partly discomposed her and renewed the tremors, which it was interesting to note, were frequently the only sign whatever of some degree of mental activity.

There are some cases of hemiplegia wherein, though the will be powerless, intense passion violently convulses the affected parts; it may be well supposed that these are not a whit less amenable to the excitement of a dream than to the agitation of the waking state.

It is very probable that chorea, epilepsy, and other forms of convulsive action, are at times first excited by the emotion of dreaming; and that this is one reason why their immediate origin is not seldom involved in so much obscurity.

iv. *Of the withdrawal of Volition.*—There are a variety of considerations all tending to show that the withdrawal of the will in time of sleep must predispose greatly to convulsive actions.

Almost all the experiments which demonstrate and illustrate the reflex function are of necessity performed after the removal of the seat of volition; and it now seems strange that those movements should ever have been called voluntary which cannot be excited until volition is withdrawn.

The reflex movements of paralytic limbs are, *cæteris paribus*, always excited with a facility inverse to the power of the will; on the partial return of that power they become more difficult to occasion, and they fail to be provoked on its complete restoration.

But *all* states which abolish the command of, or enfeeble the will, predispose to involuntary action. Putting pathology out of question, we may note the fact commonly in the course of life. In infancy the emotions are written on the expression and gestures with a freedom denotive of an uneducated, and almost powerless will; in age the hand often trembles, partly because of the declining energy of the voluntary function.

Disease shows the same truth daily. In the coma both of adults and children, I have repeatedly excited reflex movements, and have observed the experiments foiled by the return of the mind's activity. Chorea is an affection wherein the balance between the voluntary or emotional powers is temporarily broken; the tongue cannot utter and the hand is made useless from the perpetual interference of restless emotion with the yielding will.

But experiments upon sleep itself are, after all, the best exemplifiers of the condition of the will in that wonderful state, and of the readiness wherewith reflex or convulsive movements may be excited in consequence.

I passed my finger gently over the palm of the hand of a child who lay fast asleep. The fingers closed and grasped so firmly that I could draw away the arm from the side, drag it in different directions, or lift it upwards. At length the child awoke; the same kind and degree of irritation was applied, but the fingers would not close thereupon, for the will obviously counteracted the impression produced by the recently effectual stimulus.

I have times and often occasioned other reflex movements in children during sleep. I have noted the arm to be suddenly withdrawn on tickling the hand,—the orbicularis palpebræ to contract and corrugate on the eyelash being touched, whilst a frown was produced simultaneously; yet

was the child not startled, no change affected the breathing, and sleep went soundly on.

Once upon my irritating the hand of an infant in fast repose, there was a general convulsive start, and a laryngeal noise at the same moment. This fact may be compared to another; in a nearly asphyxiated newborn infant I produced several times a most distinct inspiration by tickling the palm of the hand.

These, and other similar movements, were occasioned at different periods of sleep. Increase of irritability favours them undoubtedly, but it is far from being indispensable to their causation. All that is essential is a quiescent will. According to Dr. Baly, they may be excited in their full intensity immediately after the beginning of sleep.

There are states of extreme excitability of the nervous system, such as those instanced by tetanus and hydrophobia, in which they could, no doubt, be most readily produced; but sleep, so difficult to obtain in such cases, must be guarded from irritation with most scrupulous care.

We must be prepared for failure when attempting to cause motions of this kind. Sometimes the sleeper is half aroused by the touch, and a movement follows which is emotional or voluntary. As yet, I have experimented almost exclusively on young children, preferring them because their surface is so excitable, their irritability proverbial, their motor force excessive, their sleep profound.

But the most favorable condition, not even excepting early infancy, for the production of reflex movements during sleep, is that of cerebral paralysis, attended by *anæsthesia*. A young man, made paraplegic by this form of disorder, lay sleeping profoundly; I turned up the bedclothes gently, and, having exposed the legs, pricked the soles of the feet with a pin, and provoked the quickest and strongest contractions, and renewed them again and again at pleasure, the man still reposing as fastly as though nothing had touched him. The reason was clear; he was so truly anæsthetic, that neither the raising of the bedclothes, nor the exposure of the legs to the cold air, nor even the sharp and

rude punctures were at all felt by him, though the last were very effectual in exciting a reflex action of his muscles. Extreme insensibility and extreme *excitability* prevailed together.[1]

In two other cases of paraplegia attended also by loss of sensation, I excited similar movements during sleep, and with equal facility, without awaking the patient.

Experiments of this kind are a simple and admirable test of the real state of sensation in some cases of loss of voluntary power. A patient may assert that he does not feel at all, because his sensation is obscure or abnormal; a better proof of anæsthesia lies in the fact that keen impressions on the nerves of sense break not his rest.

In cases of anæsthesia from cerebral disease, in which there is no loss or impairment of voluntary power, it would be highly interesting to try the effect of stimulating the affected surface during deep repose, with the view of provoking the muscles to contraction.

In those instances of paralysis in which the will is but partially deprived of control, and somewhat resists the influence of the means whereby we endeavour to occasion reflex movements, sleep offers a propitious time for trial.

Hybernation is a more favorable state for the production of reflex movements than that of sleep, because it more fully suspends sensation, augments irritability, and withholds the will. Dr. Marshall Hall long ago observed how very readily the hybernant animal might be excited to motion, how the "slightest" touch of the hedgehog, and the merest shake of the bat, would produce acts of inspiration. I have since noted similar phenomena. A dormouse lay in the hybernant state, not a respiratory movement was perceptible; on my lightly touching the tips of the hair, there followed quick, deep inspirations, which became gradually slower and invisible. I also excited a distinct contraction of the sphincter of the eyelid by irritating its lash, and retraction of the extremities by stimulating the feet. These obser-

[1] "La sensibilité est donc distincte de l'excitabilité."—M. Flourens.

vations were repeated. No movements of this kind can be thus excited in the same creature when fairly awake.

In the deep, long, peculiar sleep of the unborn child, motions of its limbs may be readily occasioned by to and fro moving the hand, with a light pressure, on the abdomen of its mother. I believe them to be reflex, as Dr. Simpson insists, and they occur, according to him, in the anencephalous as well as the perfect infant. This fact is incompatible with the idea which some have entertained of their being voluntary.

Reflex actions would more frequently be observed as the effects of incision during the profound sleep or coma of chloroform, but for the extraordinary influence of that potent agent on the motor force and muscular irritability. But respiration continues as a reflex act during the extreme unconsciousness, and when it fails as such, may be excited, though not invariably, by the sudden impression of cold. I happened to see Mr. Paget, when observing the effects of inflammation in the wing of a bat, which he had placed under the power of chloroform, revive the respiratory movements from time to time by simply blowing upon the skin.

But let it be again remarked in connection with what occurs in sleep, hybernation and coma, that whatever withdraws the will in the *waking* state, predisposes most obviously to the effectual excitement of reflex actions. In this way attention may predispose to them. One day when travelling by railway with a strong, keen wind blowing in my face, I found myself breathing in a deep sighing manner. My attention happened to be fully fixed, and had withheld the will from its due action on the respiratory muscles. The moment I breathed voluntarily again the impression of the cold lost its effect. Reverie, in like manner, by abstracting volition, lends power to the influence of emotion, which will act upon the person absorbed in thought much as it does upon those who lie asleep.

I have performed a variety of experiments, which all tend to show the will as an antagonist of various causes of spasmodic action. I have acted with galvanism on the hybernant dormouse, and stirred its muscles with a force which would

not have operated, at least not visibly, in the waking state. In the same way I have affected the decapitated as I could not have influenced the perfect, frog. I have remarked the limb of the human subject to be so contracted by volition as to resist galvanism. In the headless dragon-fly I have produced respiratory movements with a galvanic force which the entire insect could have readily overcome. I have made similar observations with respect to temperature. The impression of cold on the conscious and unconscious is altogether different; I have seen the eft run rapidly along a surface so heated that it would have been convulsed instantly, but for its striving will.

Illustrations of this kind would have been classed, by Lord Bacon, under the expressive and convenient head of "*wrestling instances*," which, in his own language, "we are also wont to call instances of predominance. They are such as point out the predominance of powers compared with each other, and which of them is the more energetic, and superior, or more weak and inferior."[1] Now, in sleep, the mind cannot wrestle with, and oppose any cause of convulsion, as it can in wakefulness; the body is left altogether unaided, and impressions play on it as though there were no will; and we cannot but conclude, that all kinds of physical irritation, and all forms of emotional disturbance, must have more power then. Our safety lies often in the facility with which we are awakened; by this, affrighting dreams are shortened; by this, the power is brought abruptly into play, whereby we can control or modify many forms of spasms. But here let me note a good effect of distressful dreaming in many sorts of difficult respiration. The patient complains of the repeated disturbance, and begs an anodyne, little thinking that he requires the influence of volition, from time to time, to aid his breathing, and that profound, uninterrupted sleep would soon merge into dissolution. The dreams which awaken, indirectly, preserve him.

I have already alluded to the reflex actions which may

[1] Novum Organum.

be occasioned during sleep in paralytic limbs. Paralysis should certainly be more studied both in light and deep sleep. Many instructive observations might, I suppose, be made in that extremely interesting class of cases wherein emotion acts freely on parts lost almost, or absolutely, to the influence of the will. What would be the effect of the agitation of a dream in that kind of facial paralysis in which the features are still subservient to expression, though volition cannot reach them? In such a case the symmetry of expression is destroyed in wakefulness; but in a dream it might, perchance, be restored from the will being withdrawn, by the influence of sleep, from controlling the unparalysed half of the countenance. Or, on the contrary, it might happen that the paralytic parts would be still the more influenced from being more irritable, and by consequence more easily acted on than the opposite.

But we must note the twofold influence of sleep in regard to the movement of paralysed parts. Whilst dreamful slumber may unusually disturb them, placid sleep may have such an effect in calming the emotions as to relax muscles, which seem to be invariably contracted in the waking state. A little girl, five years of age, had partial hemiplegia of the right side, the face being affected as well as the limbs. The fingers were invariably flexed in wakefulness, and very strongly under the influence of emotion, but in sleep they were perfectly relaxed, and I could straighten them with the greatest readiness. The face, too, looked quite unparalysed in sleep, though, on awaking, emotion so unequally influenced the two halves of the countenance, as to make obvious the paralysis of the right one.

In a hemiplegic woman whose arm had been long and severely contracted, the effect of sleep was remarkable. At a time when, in wakefulness, there was such obstinate contraction of the forearm and fingers, that the patient could not straighten them, nor could they be extended for her, sleep quite dispelled this involuntary motion. Wakefulness renewed it directly. Once, whilst examining the limb in

sleep, I partly disturbed the patient, and forthwith there was a convulsive starting of it.

Since making the former of these observations, I have learnt that Professor Romberg has remarked contraction of the flexor muscles of paralysed parts to cease during sleep.

Sometimes it is an object to straighten a rigid or contracted limb, and to keep it extended; sleep may offer an opportunity for doing so where we should be foiled in wakefulness.

There is nothing to wonder at in this occasional relaxing influence of sleep in instances of paralysis; the like effect of it has long since been noted by Sir Charles Bell, Sir Benjamin Brodie, and others in cases of local affections of the motor nerves.

In instances of a different description, and in which the mind takes no part in producing the rigidity or convulsive action, the muscles still act during perfect rest. Dr. Marshall Hall has mentioned a case in which the paralytic limb was contracted and drawn to the side in time of sleep. Sir Charles Bell has narrated an example of disease of the brain which occurred to a boy of eleven years of age. There was general paralysis, yet when he slept the left arm was always raised.

I observed a case of hemiplegia in a girl five years of age. She was convulsed in her sleep, but the *unparalysed* parts were *exclusively* affected. The disorder could not have sprung from emotion, for, in the waking state, the *paralytic* limbs were contracted with violence by the operation of the passions, whilst the *opposite* were under most absolute control. The effect of sleep, then, varies greatly in cases of paralysis, and this is one reason for new observation. Well investigated, it would throw considerable light not only on paralytic, but convulsive disorders; these, though seeming so opposite at first sight, are mutually illustrative to the highest degree.

A few remarks in reference to treatment arise most obviously from the preceding outline. Sleep should unquestionably be watched much oftener than it is, in order to detect, prevent, give aid in, and combat the effects of, convulsion. Symptoms which long baffle inquiry, and which

are really imputable to "hidden seizures," as Dr. Marshall Hall has termed them, can only be accounted for, in many instances, by watching sleep. It is an eventful period, speaking pathologically; apoplexy, epilepsy, paralysis, and attacks which lead either to mania or enfeeblement of mind, all, as we know, may happen then. I observed in one case that a peculiar, transient, recurrent kind of partial anæsthesia was produced by sleep.

The patient should always be awakened if convulsions threaten, or if the sleep be unusually heavy and profound, or disturbed by harassing and tumultuous dreams. A fit may be indicated by turgidity of the veins of the head and neck, by a quivering of the muscles of the face, startings of the limbs, contraction of the fingers, crowing inspiration, and a dilated pupil; but persistent expiratory efforts are especially alarming, and frequently begin the attack.

Sometimes it will be enough simply to partially arouse the patient; but frequently it will be necessary to completely awaken him, and keep him awake. Assuredly there are some cases in which sleep and epilepsy are not merely coincident, but absolutely related as cause and effect. Esquirol narrates an instance of the disorder in which the attack was uniformly preceded by sleep, to prevent which was to postpone it always. Heberden speaks of another, in which the patient entreated the bystanders to restrain him from sleeping. Dr. Hugh Ley mentions a case of laryngismus stridulus, in which the coming paroxysm was delayed most evidently by keeping the child awake and amused. Mr. Solly mentions an epileptic who believed that he could prevent his paroxysms by inspiring deeply. I well remember watching a patient in partial epilepsy; for awhile he strove successfully with the incipient attack, commanding his breathing, and opposing, by his volition, the contraction of his hands; but, at length, he fell into complete unconsciousness and pitiable contortions. I have seen many cases in which spasmodic action has been entirely mastered by efforts of the will.[1] In limbs partially

[1] I may refer to a communication made by me to the 'Lancet' for 1840,

paralysed, but prone to spasm, I have remarked emotion and volition to contend together, and now one prevail, and now the other. A good example of a wrestling instance is given by Cruveilhier, who speaks of a case of flexion and rigidity of the lower extremities, which was permanent unless a great effort at extension was made. But I doubt not that even epilepsy is far oftener prevented in wakefulness than we think, by those efforts of the mind which should, by all means, be encouraged. This is partly to be explained by our rule over emotion; partly, perhaps, by the effect of attention; but, most of all, by the command of volition over the respiratory movements. In sleep this is lost to us; and in that state we find the truth negatively exemplified, that volition is not only a directing, but very often a conservative, power. It is stated amongst the aphorisms of Hippocrates that the arrest of respiration indicates convulsions. And certainly the excitement of inspiration hinders them, as Dr. Denman showed when he suddenly applied cold to the face in cases of puerperal paroxysm.

In the deep sleep which not uncommonly succeeds to epilepsy, inspiration may, occasionally, be most advantageously produced by means of sudden and transient cold, the return of blood from the congested brain being, by this means, greatly promoted; and where there is dangerously

and to an essay on "Some of the Relations of Volition to the Physiology and Pathology of the Spinal Cord" in the 'Medical Gazette' for 1848, in which I have more fully entered into the question of the antagonism between the power of the will and various causes of spasmodic action. See Professor Volkmann's remarks in 'Müller's Archives' for 1838, and a note of Dr. Baly in his translation of Müller's 'Elements of Physiology,' 2d edition, p. 800; and Dr. Marshall Hall's second and third memoirs on the "Nervous System," in the Transactions of the Society. Dr. Holland's reflections on Sleep, Dreaming, and others, also, in which he refers directly to Volition, may be consulted with great advantage in respect to several points on which this paper touches. I would also make reference to some observations of Mr. Hunter, Mr. Grainger, Dr. William Budd, Dr. Watson, Dr. West, Dr. Carpenter, Dr. Kirkes, and Mr. Paget, and those which Dr. Sibson has published, since the reading of this paper, in the last volume of the 'Provincial Medical Transactions.'

profound coma, it may be necessary to irritate, and even to rapidly and severely inflame, the skin, so as to preserve consciousness by pain. The successful treatment of narcotic poisoning suggests much here.

There are some further points respecting the management of convulsive diseases in time of sleep, to which allusion will be excused on account of their importance. The sleep of the epileptic does harm often, both from deficiency and excess; and there are many cases in which it should, if possible, be as regularly recurrent as that of plants. The mind should be calm previous to repose, lest it be hard to obtain or dreamful; but its approach is often deferred by intense anxiety.

The head should be elevated,—but *after* sleep has come on, if the patient, from fear of obstinate wakefulness, object to raise it previous to repose; states of anæmia make exceptions to the rule. Indigestible or immoderate suppers and drastic purgatives, and anything whatever which may irritate the sleeper, or produce dreaming, or embarrass his respiration, should be shunned, of course. Opiates are generally to be avoided in epilepsy, for they make sleep too profound, or occasion excitement; but delirium tremens no more contra-indicates their use than the incessant motions of the obstinate chorea which endangers life by exhaustion; and chloroform may be found of essential value, when other narcotics have been tried and have failed.

More indications in reference to treatment might here be touched upon, but I fear to trespass longer on the indulgent attention of the Society; and would only add an expression of the hope that this small contribution, although very imperfect, may be of some service to future inquirers.

ON

FATTY DEGENERATION OF THE PLACENTA,

AND

THE INFLUENCE OF THIS DISEASE

IN PRODUCING ABORTION, DEATH OF THE FŒTUS, HÆMORRHAGE, AND PREMATURE LABOUR.

BY

ROBERT BARNES, M.D. (LOND.)

OBSTETRIC SURGEON TO THE WESTERN GENERAL DISPENSARY, AND LECTURER ON MIDWIFERY.

COMMUNICATED BY

PROFESSOR MURPHY.

Received February 19th.—Read May 13th, 1851.

CASE I.—In October, 1850, Mr. Humby sent me a placenta taken from a lady who had been prematurely delivered. In the sixth month of pregnancy, this lady was seized suddenly, and without pain, with flooding, while walking in the garden, but not having used any extraordinary exertion. The flooding stopped on this occasion, and returned without pain or any obvious cause in about three weeks. This time premature labour followed. The child presented every sign of having been dead some time before delivery.

Appearance of the Placenta.—The uterine surface was studded with fatty masses, varying in size from that of a bean, to one mass which was as large as a pigeon's egg. These masses extended inwards into the substance of the placenta, and the largest occupied the whole thickness, and was visible on the fœtal surface.

Although the difference of structure and consistence between these masses and the normal placental tissue was striking, it was difficult to isolate them by dissection. The placental tissue appeared to have undergone a fatty transformation in the seat of these masses, and not that fatty tumours had become developed independently. The fatty masses were traversed like the rest of the placenta, by branches of the umbilical vessels. Indeed it was obvious from the dissection, as was subsequently demonstrated by microscopical analysis, that the fatty masses were constituted of placental structure variously altered, either by the simple deposition of fat, or by actual degeneration. They were of dense structure and firm consistence, of a pale yellowish colour; the knife used in incising them was rendered greasy; and portions laid upon paper caused a greasy stain. No vestige of blood could be seen in them. They appeared as hard foreign bodies, interspersed in the softer spongy structure of the healthy placenta.

It was manifest that this diseased condition of the placenta was the cause of the hæmorrhage, of the death of the fœtus, and of the premature labour; and I shall presently endeavour to explain in what manner I conceive these events were brought about. I deferred publishing any account of the case until I should receive a report from my friend Dr. Hassall, upon the minute anatomical structure of these fatty masses, having forwarded to him specimens for examination. Dr. Hassall did examine them; but being too much engaged at the time to make drawings and commit to writing an account of his observations, preserved specimens until his leisure should permit him to complete what I required.

Case II.—In December, 1850, Mr. Humby sent me another placenta for inspection, which had been taken from a patient who had also been delivered prematurely. In this instance there was no hæmorrhage, but labour had come on suddenly at the seventh month. As in the former case, the child appeared to have been dead some time before delivery.

Appearance of the Placenta.—Nearly one-half of the uterine surface was thickly studded with fatty masses, varying in size from that of a pea to that of a walnut. Adipose matter appeared to be aggregated into firm defined masses, isolated from the surrounding placental tissue. No large umbilical vessels could be traced in their substance. In this respect they differed from the tumours in the first placenta: possibly the vessels had been obliterated or replaced by cellular tissue, in consequence of pressure and cessation of function. The minute structure of the masses in this case differed, however, in no particular from that of the first: like them, they were composed of umbilical capillaries and villi, with the investing chorion in various stages of fatty deposition and degeneration. In the grosser physical characters also, the masses found in both placentas entirely corresponded. In this case, as in the former, the masses were chiefly seen on the maternal surface of the placenta, the larger ones penetrating more or less deeply into its substance; some even occupying its entire thickness. There were only two or three small spots in which it could be perceived that fatty masses were being developed on the fœtal surface. The masses were of solid consistence, and appeared as hard bodies imbedded in the softer spongy structure of the healthy placenta.

This second case confirmed me in my opinion as to the importance of this alteration in the structure of the placenta. It showed that not only hæmorrhage might be occasioned by it, and hence premature labour; but also that premature labour might be excited in consequence of the death of the fœtus, which had, in all probability, been brought about by the necessarily imperfect performance of the functions of the placenta. I forwarded portions of this placenta also to Dr. Hassall, and procured from time to time healthy recent placentas, that we might be enabled to compare the healthy and diseased structures.

While waiting for the drawings of the intimate structure of these fatty placentas, which Dr. Hassall had undertaken

to prepare for me, I observed in the 'Brit. and For. Med.-Chir. Rev.,' for January, 1851, an account of a case of fatty degeneration of the placenta by Professor Kilian. The case, in its pathological history, nearly resembles the second case related in this paper; death of the fœtus and premature labour are correctly ascribed to the placental disease. But I cannot think it necessary, with reference to the cases I have observed, to discuss and to refute, as Professor Kilian does, the possibility of these fatty masses being of post-mortem production, or the supposition that they are the result of the conversion of blood-globules into fat. In the perspicuous statement of the microscopical examination which follows, Dr. Hassall has, I think, clearly established the true character and origin of this important affection in the cases which form the subject of this communication.

I have here to mention that I am not acquainted with any description of fatty degeneration of the placenta, or even with any account of a case of the disease, excepting Professor Kilian's and those recorded in this paper, sufficiently precise and minute to establish its exact nature and importance. In the numerous obstetric works I have consulted, I find only the most casual and general allusion to the disease.

The minute pathological changes observed in the placentas, are accurately described in the following report of Dr. Hassall, and faithfully delineated in the accompanying drawings.

I transcribe the report:

"I am sorry to perceive that the delay which has occurred in the preparation of the drawings, illustrative of the general anatomy of the normal and abnormal placenta, has been the cause of your being anticipated, although to a slight extent only, in the publication of your important observations on that organ; and I regret the circumstance the more when I consider that I am mainly responsible for that delay.

"The pathological changes which occur in the placenta from fatty deposition and degeneration, will be more clearly comprehended if we take, in the first place, a brief survey of the normal structure of that organ.

"The disease in question, so far as my observations have

yet extended, originates in, and is mainly limited to, the fœtal portion of the placenta; it is this, therefore, that we shall have to describe more particularly, which, it is to be remembered, however, constitutes almost the entire substance and bulk of the organ.

"The placenta is divisible into numerous lobes and lobules of variable size, and consists of two portions, a maternal and a fœtal.

"The *maternal portion* is made up of blood-vessels, arteries, and veins, dilating into sinuses, derived from the mother, and which are covered externally with a layer of cellular decidua (see fig. 1). The cellular decidua is usually described as enveloping each villus, of which it is enumerated as forming one of the coats. This description I have not been able to verify; it is extremely rare to observe this membrane in connection with the villi; and I believe that the *tufts* of villi are *not in union*, but merely *in apposition* with this layer, which covers and dips down between and into the lobes and lobules of the placenta.

"The *fœtal portion* consists of the ramifications of the umbilical vein and arteries enclosed in a layer of chorion. Each umbilical artery, after numerous divisions, and when reduced to a certain diameter, gives off consecutively a series of loops, the last of which terminates in a radicle of the umbilical vein. The placental villi are either *simple* or *compound*, according as they consist of a single loop, or are made up of an arterial and venous trunk, with numerous intervening loops. The plan of development of the terminal divisions of the blood-vessels constituting the fœtal placenta, is very peculiar, and is not, I believe, generally recognised. Each vessel is *double*, that is to say, the same vascular sheath is divided by a septum into two channels. This formation is best seen in fragments of recent placentas which contain blood, and which have been immersed in a weak solution of common salt, or in injected preparations.

"A second very great peculiarity is the unusually large diameter of the capillaries forming the loops of the villi, and

which is such as to admit two or three rows of blood-corpuscles at a time.

"The walls of the placental blood-vessels, like those of other vessels of the same diameter occurring elsewhere, are thickly studded with elongated nuclei, which, in fresh healthy placentas, are obscured, though not concealed, by the chorion (fig. 3 *a*). It is best seen in fragments of placenta which have been immersed, for a few minutes, in water, or extremely dilute acetic acid. Such fragments, viewed with an object-glass magnifying 350 diam. lin., present to observation innumerable nuclei; some of these belong to the chorion, but others to the vessels beneath. Skirting the margins of the vessels will be noticed, in particular, a series of cells of a slightly oval form; these belong exclusively to the chorion (fig. 3 *a*). In perfectly fresh placentas the chorion adheres so firmly to the vessels that it is difficult to detach it; when, however, the placenta has been kept a day or two, it separates readily enough, and in fragments torn up with needles, the membrane will be found, in some cases, to be attached to the vessels, and in others to have become removed (fig. 3 *b*).

"Such is a very brief outline of the structure of the normal placenta. In the *placenta affected with fatty degeneration*, certain of the lobes, in place of presenting the red spongy texture of healthy tissue, exhibit a fatty appearance, and are of a yellow colour, glistening, firm, and exsanguine, while the remaining lobes present their ordinary characters, at least to the unaided eye.

"I will now endeavour to determine the nature of the changes which have ensued in these altered lobes, and examine both the maternal and fœtal portions of the placenta as contained in them.

"The maternal portion, as already described, consists of the fibrous walls of the internal blood-vessels, covered on the outside by cellular decidua. Both these structures presented, to a great extent, their normal characters; the walls of the vessels were nucleated, and the cells of the decidua were of the usual size. The important difference, however, was

noticed that both vessels and cells were studded over with numerous minute spherules, some of which appeared to be upon the surface, but others evidently were contained within the coats of the vessels, and in the cavities of the cells (fig. 2). The maternal portion of the placenta was therefore not free from disease.

"The fœtal portion of the placenta, as already noticed, consists of the umbilical vessels and chorion. On placing a small portion of one of the diseased lobes in water, the first thing which strikes the observer, is that the tufts of villi do not expand or float out in the same way as in the healthy placenta, and on endeavouring to separate the fragments into its component villi with needles, the extreme brittleness of the whole structure becomes apparent. Examined with the half-inch object-glass, the villi are observed to be much broken up, and darker than usual, especially near their terminations, which reflect a yellowish colour. Viewed with a glass of 420 diam. lin., a variety of structural changes are detected.

"1st. We observe that the villi are thickly studded with innumerable minute spherules of oil (figs. 4, 5).

"2d. The chorion is much altered; it is thickened, and destitute of nuclei.

"3d. The walls of the vessels no longer contain nuclei; these having, in all probability, become degenerated into spherules of oil (fig. 5).

"4th. The spherules of oil are contained, some in the chorion, some in the walls of the blood-vessels, and many in the intervals or spaces between these (fig. 5).

"5th. The cavities of the vessels are almost invariably free from fatty deposition.

"6th. The vessels are destitute of blood (figs. 4, 5).

"Such was the usual condition of the several component structures; sometimes, however, in places, the disease appeared to have progressed still further, and to have produced almost complete disorganisation and disintegration of tissue.

"Turning our attention to those lobes of the placenta which, to the eye, present a normal appearance, we detect

in them manifest evidences of the same destructive changes in progress; considerable fatty deposition is visible, and the nuclear structure of the parietes of the blood-vessels and of the chorion is, to some extent, implicated (fig. 4). In these portions, the distribution of the oil-molecules coincides exactly with the course of the blood in the vessels. This observation shows that the condition of the blood itself is intimately connected with the origin of the deposit.

"It must not be forgotten, however, that a very small quantity of fat, in the form of minute spherules, is almost constantly present in the placenta.

"In order to judge how far the pathological changes in the placenta resulting from fatty degeneration above given, accord with those observed by Professor Kilian, I will quote his description.

"'Examined with the microscope, the *extreme ends of the vessels* of this portion were found to form little knobbed swellings composed of *fat-globules*, strongly reflecting the light. From these ends of the vessels filled with fat droplets closely packed together, the blood-corpuscles of the placental vessels were quite absent; but in proportion as the vessels were traced back from their terminations, the fat-globules were progressively replaced by blood-globules, the walls of their vessels which, at their terminations, were also loaded with fat, recovering their natural appearance. The remotest ramifications of the healthy portions of the placenta continued entirely normal; and where the yellow portion joined the coloured, many of the terminating vessels were destitute of fat; others contained droplets, but none showed the dense masses observed at the uterine surface.'

"I will quote another passage conveying Professor Kilian's remarks on the origin of this disease. 'But it may be inquired whether this fatty formation occurs during the healthy conditions of life, and becomes the *causa mortis*; whether it results from decomposition after death, or whether, originating during life, it may be but the expression of other causes, inducing the degeneration of the ovum, and a symptom of retrogressive metamorphosis of the placenta.

On examining the fœtus, all parts were found apparently normal, except a contused state of its head and face, and a large effusion of blood between the scalp and the cranium; so that it might be inferred that the child died from some cause of pressure on the brain, and the described changes in the placenta were only the product of decomposition consequent on its death. Against this view, however, many objections may be urged. There is no fact known of the conversion of stagnant blood into fat. Virchow and Reinhardt have only seen the formation of fatty corpuscles within the colourless blood-corpuscles. The changes which occur in the terminations of the blood-vessels, or other metamorphosis after death, authorise no such view. The author, too, (Professor Kilian) after macerating healthy placentas in water until approaching putrefaction, never found this obturation produced, a few droplets here and there being formed only on the walls of the vessels.' "

Connected with the anatomical facts thus related by Dr. Hassall, are various physiological, medical, and obstetric considerations of great interest and importance. Some of these I will endeavour to point out as comprehensively as possible.

The researches of Rokitansky, Bowman, Handfield Jones, George Johnson, R. Quain, Paget and others, taken collectively, fully assert the prominent position which fatty degeneration is destined to occupy in general pathology. To demonstrate the existence of a disease in the placenta, an organ intermediate between the mother and her offspring, similar in its nature, development, progress, and termination to that which the observers I have referred to, have shown to be of such importance, when affecting the liver, kidneys, heart, muscles, vessels, and other structures of the body, cannot be uninteresting. The demonstration of fatty degeneration in the placenta, not only supplies a new chapter in the history of the disease, aiding in the acquisition of a more comprehensive knowledge of its nature, but it also throws a new light upon a question of the deepest interest in the study of this and many other of the most formidable diseases. Long-con-

tinued observation and accurate analysis have established the hereditary nature of insanity and phthisis; our acquaintance with fatty degeneration is too recent and too little advanced to have admitted of any extended investigations into the transmission of this disease to successive generations. There exist, therefore, at present few facts from which any trustworthy conclusion can be drawn. The occurrence, therefore, of fatty degeneration in the placenta, the organ by means of which the embryo derives the materials for its growth from the mother, and in which the elements of mother and child are being constantly interchanged, affords the strongest presumptive evidence, that the germs of that disease which pervade the system and circulate in the blood of the mother, may be directly transmitted to her offspring.

In support of this view, that the placenta may be the medium through which the various morbid diatheses may be propagated from the mother to the embryo, and also as affording further proof that the placenta is in nowise exempt from those diseases which affect the permanent organs of the female, it deserves to be remembered, that the placenta may be attacked by inflammation and congestion; that it may be the seat of the deposition of fibrin, cartilage, bone, and even cancerous matter; and the case of a phthisical patient is related[1] in which small crude tubercles were formed on the external surface of the uterus, under the peritoneum, and eight or ten on the uterine surface of the placenta.

With regard to the frequency of fatty disease in the placenta, it is at present difficult to form an accurate opinion. I am in the habit of minutely examining the placenta on every opportunity; and I have not unfrequently seen fatty masses in various stages of growth in placentas expelled at the full period of gestation. In these cases it is to be presumed, that the balance of healthy placenta preserved was sufficient for the development of the fœtus. There are certain physiological considerations which render it probable,

[1] M. Hardy, 'Arch. Gén. de Méd.,' Juin 1834.

that the placenta is especially prone to become the seat of fatty deposition. The decarbonising function of that organ is one; but there are several others which deserve attention. Pregnancy itself appears to predispose to the formation of fat. The increased proportion of fibrin in the blood; the tendency to albuminous urine; the constant presence of fat in that secretion; the secretion of fat in the breasts; and the observation that a certain amount of free fat is always present in the healthy placenta, constitute a series of facts, which, viewed in their relation to each other, may elucidate those morbid processes which lead to the production of an excess of fat in the circulating system. Certainly, the elimination of this material from the economy, is obstructed by the encroachment on the cavity of the chest, the pressure upon the liver, kidneys, and other abdominal organs, and the growing disinclination to exercise, which attend the progress of gestation.

The observation of fatty degeneration in the placenta presents another point of interest with reference to the study of the general pathology of that disease. It furnishes an example of the *rapidity* with which it may proceed, which is capable of close limitation. The placenta being a caducous organ lasting but a few months, all the pathological changes observed in it, we know, must have been wrought within a certain brief period of time. When we find, therefore, that the disease has proceeded from simple deposition to degeneration, and even disintegration of the original tissues in a placenta expelled at the seventh month of pregnancy, we are in possession of accurate data by which to form an estimate of the rapidity with which these changes may occur. No similar data can be obtained with reference to the like changes in other organs.

I will not, however, dwell longer upon the general relations of fatty degeneration of the placenta, as I am anxious to advert to the practical bearings of the disease on obstetric practice.

The effects that must result, sooner or later, according to the rate of increase of the morbid alteration of an organ so essential to the fœtus as the placenta, are not difficult to

understand. In exact proportion as the growth of the embryo requires a larger and more unimpeded extent of placental structure, in which its blood may be brought into multiplied points of contact with the blood of the mother, large portions of placenta are being gradually rendered useless for this purpose; and the coats of the villi throughout the remainder are probably undergoing a disorganisation which must materially impede the performance of their function, of permitting the interchange of elements between the maternal and fœtal blood. If this conversion of healthy placental structure proceed at such a ratio as to exceed the normal increase of healthy placental tissue, a period must arrive when the healthy portion of placenta will be insufficient for the production of those changes in the blood of the fœtus which are essential to its growth and life. When this period arrives, then, the fœtus will perish, and premature labour will follow,—unless, indeed, premature labour be induced during the life of the fœtus by a process to which I will next advert.

One of the conditions essential to the perfect cohesion of the placenta to the uterus, is the preservation of the uniform spongy structure of the placenta. The whole uterine surface of the placenta must present an equal consistence, so that every part may permit of equable distension, whether from the maternal or the fœtal circulating system, and be equally adapted to the opposing surface of the uterus. This condition is necessary to enable it to preserve this adaptation throughout the peristaltic movements to which the walls of the uterus become more and more liable as gestation advances. But when, as is the case in these examples of fatty tumours in the placenta, certain parts of the uterine surface are hard and unyielding, while intervening portions are of a soft and yielding character, the entire placenta is no longer in a condition to follow the movements of the uterus and preserve its connections. The hard portions, moreover, in which fat has occupied the walls of the fœtal vessels, and by pressure obliterated the cavernous structure, no longer maintain any vascular communication with the uterus. The maternal

or cavernous portion of the placenta being either closed up, or otherwise rendered useless, the channels of communication with the uterus necessarily disappear. Accordingly, in these portions no oblique valvular openings, no remains of arteries, could be discerned, such as usually exist, and such as were observed on the maternal surface of the more healthy portions of the diseased placentas. The consequence of this loss of homogeneity of tissue, and cessation of vascular connection with the uterus, is, that when the peristaltic movements of the uterus assume an active character, as they often do towards the seventh month of pregnancy, or even earlier, the cohesion between the placenta and the uterus is soon destroyed at those points where the fatty masses are largest and hardest. This partial disruption can hardly occur without involving some separation of the placenta not diseased, in the immediate proximity of these masses. Hæmorrhage results; the effusion of blood and the formation of coagula excite increased action of the uterus; further detachment follows; premature labour is imminent; and if it ensue immediately, the child may be born alive. But this event may not occur on the first appearance of flooding, as the first case I have related will show. Should it not so happen, the favorable opportunity for the child will be lost. That amount of disease which is sufficient to cause partial detachment of the placenta is scarcely compatible with prolonged life of the fœtus; and in all probability, the fœtus will have been cut off from defective nutrition, before a further detachment and hæmorrhage could bring about the expulsion of the contents of the uterus.

I think the two cases I have related are interesting and valuable as illustrations of the two processes just described. In one case, premature labour was induced by partial detachment of the placenta and hæmorrhage; in the other, the premature labour was the result of the death of the fœtus. Certainly in one, probably in both, the death of the fœtus was occasioned by the gradually increasing obstruction of the placental circulation.

I have thus referred to the different states of fatty

degeneration in the placenta, entailing different consequences to mother and embryo, according to the ratio of increase the disease may have followed. In the first kind, the disease has made so little advance, that the child may be carried in safety to the end of the natural term of gestation. In the second kind, of which I have given two examples, the disease has proceeded at such a rate as not necessarily to involve the destruction of the child. At the seventh month the child is viable, and if, as I have shown, premature labour should, by any means, be induced before the child has perished, a living child may be born. I have now to indicate a third kind or degree, which not only places the mother in danger, but necessarily destroys the embryo. If the disease proceed so rapidly as to have invaded a large portion of the placenta in the *early* months of pregnancy, it may be the immediate cause of abortion.

The various causes of abortion usually enumerated by systematic authors, are mostly insufficient to account for the event. I believe there is a growing disposition to attribute to diseases of the ovum the first place; and those who are in the habit of examining the ova of women said to have aborted in consequence of injuries, mental emotions, habit or other causes assigned to the mother, will, perhaps, be disposed to admit, that such ova exhibit, for the most part, appearances of disease which deserve a large share of attention in determining the cause of the abortion. Observation inclines me to conclude that disease of the ovum mostly precedes its detachment from the uterus; and perhaps future experience will show that fatty deposition is a disease to which the ovum is particularly obnoxious.

As a *cause of hæmorrhage* before delivery, this disease of the placenta is especially deserving of consideration. When this event occurs in the course of pregnancy, it is usual to infer that the placenta has been in part, or wholly, detached. When the placenta has been attached to the cervix uteri, the hæmorrhage is easily explained; but when this is not the case, then I would hazard the opinion that the detachment was preceded by disease of the placenta.

With regard to the treatment or obstetric management of these cases, I wish to offer a few observations. There are few conclusions which have acquired a more settled possession of the minds of obstetric practitioners than this; namely, that patients are liable to a recurrence of affections in future labours similar in character to those which had occurred in former labours. Consequently when a particular anomaly or disease has occurred before, and especially more than once, to place the mother or her offspring in peril, it is an established rule to endeavour, in subsequent pregnancies, to anticipate the expected unfavorable result by timely interference. As a striking illustration of this recurrent tendency of some disease of the placenta, I am tempted to quote the following case:—

In 1847, I saw a placenta exhibited to the Pathological Society, by Dr. Ramsbotham.[1] It was enormously hypertrophied, but did not appear to consist of more than ordinary placental tissue. The patient from whom it was taken had lost six children successively, which had all been expelled putrid. In each instance the placenta had been hypertrophied, adherent, and generally contained indurated masses of lymph. On her being a seventh time pregnant, it was deemed expedient to induce premature labour with the view of saving the child. The attempt was not successful: the child gasped heavily two or three times, and died. I entertain little doubt that the fatty degeneration of the placenta is a disease peculiarly apt to recur in successive pregnancies, and to blight the fruit of successive conceptions. I believe, therefore, that the rule I have referred to finds an appropriate application in this case. When it has been observed that the embryo has been lost in one or more pregnancies, in consequence of this disease, it must be a matter for serious consideration whether the induction of premature labour should not be recommended in a future pregnancy.

Many other points having more or less bearing upon this

[1] Transactions of the Pathological Society, 1847-8.

subject present themselves; but I am anxious that this paper should not be extended to an improper length; and that its more practical features should not be overlaid by speculations. In concluding, I cannot but express my sense of the many imperfections of this paper. But however imperfect, I am not without hope, that this account will be accepted as a useful contribution in extending the knowledge of an important subject in general pathology; and in directing attention to a source of danger to mother and child, comparatively unnoticed in obstetric practice.

APPENDIX.

Since the foregoing paper was submitted to the Society, I have, through the kindness of Mr. Bartlett, of Notting-hill, been put in possession of the following case, illustrative of a new feature in the history of granular deposit and degeneration of the placenta.

A lady, about three months and a half pregnant, was riding over a very rough road in a dog-cart; she was much shaken; and making a false step in getting out, she suffered further succussion. Symptoms indicating the death of the fœtus followed, but miscarriage did not ensue. She went on to what she calculated to be the full term of gestation before labour took place. The ovum was expelled entire; it was found that the embryo had attained the development only of the fourth month; there was no sign of putrefaction. The placenta was an inch in thickness, nodulated in parts, universally firm in texture, and of a yellowish-white colour. It had undergone general granular metamorphosis. The entire ovum has been preserved in spirit for some months; but the adipose character of the placenta was remarked by Mr. Bartlett in the recent state. Portions of it have been submitted to microscopical examination by Dr. Hassall and myself, and appearances identical in character with those described in the placentas of the two cases related in my former communication have been ob-

served; the main difference being, that in this instance every part of the organ is affected.

There can be little doubt that the fœtus really perished in consequence of the succussion the lady experienced in the early period of pregnancy. Whether the ovum had been previously affected with a disposition to granular degeneration, or any other disease, must be a matter of conjecture only. In all probability the granular metamorphosis of the placenta, if it did not take its rise at that date, was, at all events, completed subsequently to the death of the fœtus. During this process of conversion, the placenta probably preserved its connection with the uterus. One singular purpose it evidently fulfilled, was the preservation of the ovum from putrefaction, and its retention in the womb for some months after the death of the fœtus.

Authors have recorded cases in which the placenta has been retained for a lengthened period after delivery, without giving rise to those symptoms which usually attend putrefaction or the presence of a foreign body in the uterus. Saxtorph even says, "I have reason to believe that a placenta, which is entire and uninjured, enclosed in the uterus, adherent to it, and shut out from access of air, *never becomes putrid.*"

In many of these cases it is highly probable that granular metamorphosis is the conservative process.

In connection with the present case, I am desirous of defining the meaning I wish to attach to the terms "fatty deposition" and "fatty degeneration," more especially as they are apt to convey different ideas to different pathologists.

Fat, properly so called, is a normal organised structure, consisting of blood-vessels and cells, the cavities of which contain oily matter. This, like other organised structures, is subject to various lesions, such as hypertrophy and atrophy, or degeneration. It is to this latter condition, as affecting the organised adipose tissues, that the term "fatty degeneration" ought in strictness to be confined. This, the true fatty degeneration, differs entirely from that affection of the

placenta which I have, in my first communication, brought under the notice of the Society. In this affection of the placenta there is no formation of fat, but deposit of oil in the form of minute granules or spherules, and consecutive degeneration of the structures in which the oil is deposited. "Granular oily deposit in, and consecutive degeneration of, the proper tissues of the placenta," would be a more correct and precise expression to indicate the nature of the changes which that organ undergoes in consequence of the affection which, for the sake of brevity, and uniformity with others, I have denominated "fatty degeneration of the placenta." In its anatomical characters it corresponds with that affection of the liver and kidney to which the term "fatty degeneration" has been generally applied.

This distinction between true fatty degeneration and granular deposit, with accompanying degeneration, is important to bear in mind; it has been pointed out by several recent pathologists. By many the term "fatty deposit" is applied to the abnormal development of true fat; and "fatty degeneration" to the deposit of oil and degeneration of structure which occur in the liver, kidney, &c. Employed in the above sense, it is obvious that these terms are inaccurate.

The granular oily and disorganising affection of the placenta may manifest itself under very different conditions:—

1st. It may, no doubt, occur during life as the result of the transformation of fibrin or albumen effused through inflammation. We have analogous examples in the change which clots of blood, fibrin, &c., undergo in other organs of the economy. I have examined a placenta in which osseous matter, fibrin, and granular degeneration were all observed; but I was unable, in this instance, to determine whether or not the granular degeneration was the result of changes effected in the bony matter, and fibrin previously effused. The converse sequence of events may hereafter be observed. It is possible that the coats of the umbilical vessels may be so weakened by granular degeneration, at a period when blood is still circulating in them, that rupture and hæmor-

rhage may ensue. This may be one cause of placental apoplexy, resembling that form of cerebral apoplexy described by Mr. Paget as occurring as a consequence of granular degeneration of the capillaries of the brain.

2dly. It may originate in functional derangement either in the placenta or in remote organs, and apart from organic lesion. I believe the two cases which form the subject of the first communication must be referred to this head. It would appear that organs having a decarbonising function to perform,—as the liver, kidney, and placenta,—are especially prone to suffer granular oily degeneration.[1]

3dly. It may occur as a post-mortem change, and resemble the metamorphosis of muscular tissue into oil, and the formation of adipocire. Of this form, the case recorded in this Appendix offers a striking example. Although of less importance in relation to obstetric practice, it is still not without pathological interest to establish the fact, that granular metamorphosis may take place in the placenta while retained in the living womb.—*May* 24, 1851.

[1] Dr. Mackenzie brought me (May 29th) a placenta quite fresh, healthy-looking, of average size. It had been expelled at full period; the child was living; the mother had enjoyed good health throughout gestation. Extending over about half the fœtal surface, under the membranes, there is a layer of a glistening yellowish-white substance, exactly resembling true fat. On making a section, this layer was found to be in parts nearly half an inch thick. In colour and firmness it offers a remarkable contrast with the healthy placental tissue. It may be separated into two or three laminæ but is intimately adherent to the proper placental structure. This fatty-looking substance was examined while quite recent with Dr. Hassall. The basis of it was found to be *fibrin;* it showed obscure fibrillation, but no organic structure. From whatever part a section is taken, innumerable spherules of oil are observed in it. This specimen offers a clear example of an effusion of fibrin in the placenta undergoing granular degeneration.

PLATE I.

FIG. 1.—*Normal Placenta.*

Portion of the maternal placenta.

A. Wall of cell.

B. Cells of decidua.

Magnified 420 times.

FIG. 2.—*Abnormal Placenta.*

Portion of maternal placenta affected with fatty degeneration.

A. Wall of blood-vessel.

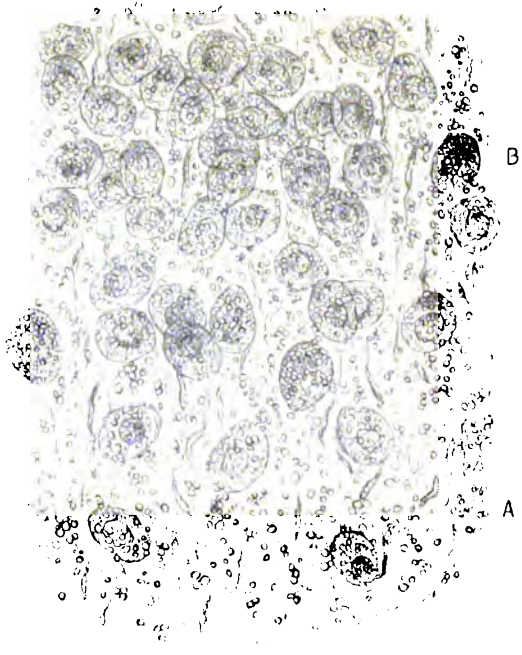
B. Cells of decidua.

Magnified 420 times.

MATERNAL PLACENTA.

Fig. 1

Fig. 2.



On Stone by E. Hayes

PLATE II.

FIG. 3.—*Normal Placenta.*

Portions of a villus.

A. Vessel with its investing chorion.

B. The same deprived of its chorion.

C. Chorion detached, showing its cellular formation.

Magnified 420 times.

FIG. 4.—*Abnormal Placenta.*

Villi affected with fatty degeneration in an early stage.

A. Vessels invested with chorion.

B. Vessels denuded of chorion.

Magnified 220 diameters.

FIG. 5.—*Abnormal Placenta.*

Portions of a villus affected with fatty degeneration.

A and B. Branches partially denuded of their investing chorion, and showing much fatty deposition in the form of minute spherules.

C. A blood-vessel entirely deprived of its chorion.

Magnified 420 diameters.

Fig. 3.

Fig. 4

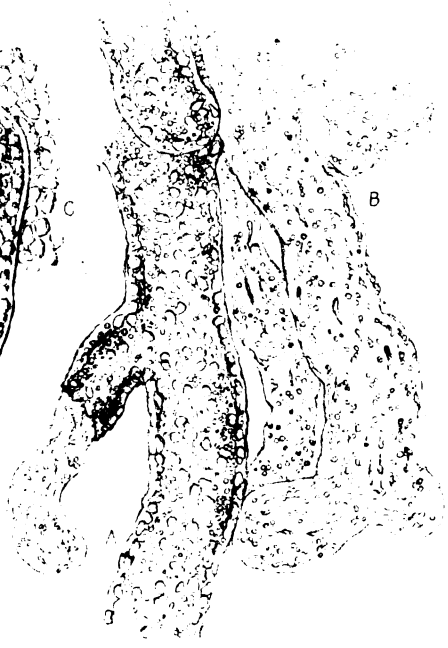


Fig. 5

ON SOME SECONDARY PHYSIOLOGICAL EFFECTS PRODUCED BY ATMOSPHERIC ELECTRICITY.

BY

C. F. SCHÖNBEIN,

PROFESSOR OF CHEMISTRY AT BÂSLE, ETC., ETC.

COMMUNICATED BY

M. FARADAY, D.C.L., F.R.S.,

PROFESSOR OF CHEMISTRY AT THE ROYAL INSTITUTION,
HONORARY FELLOW OF THE MEDICAL AND CHIRURGICAL SOCIETY.

Received March 7th.—Read June 24th, 1851.

As artificially excited Electricity produces some very striking effects upon the animal system, so it has been very often supposed that Atmospheric Electricity also exerts a powerful influence on living beings in general, and on the human body in particular.

Although much has been said and written on this supposed influence, yet I am afraid that the best of it will not reach beyond the limits of conjecture; and most of it will fall, not only within the circle of "doubtful truths," but within the larger compass of evident errors.

If a chemist may be allowed to give his opinion on a physiological subject, I should venture to say, that the physiological importance of electricity has, upon the whole, been much exaggerated, that agent, in comparison to heat and light, acting but an inferior part in the economy of organised beings.

For more than one reason, it is not, however, my intention to enter here into the entire details of so difficult a

subject; and I therefore shall confine myself to pointing out some indirect effects of electricity, which, in my opinion, are of peculiar interest both to the physician and to the physiologist.

Philosophers endeavour to distinguish between the immediate and the indirect effects of any cause, and they are assuredly very right in doing so; but, in many cases, it is very difficult, or quite impossible, to make the distinction.

As to electricity, it seems as if it were capable of acting directly upon all the organs of sensation, upon that of smell, &c.

Concerning the cause of the peculiar sensation apparently excited by electricity in the olfactory nerves, it may now be considered as a settled point, that it is not electricity itself that produces, what has often been called, the electrical smell, but that it is the peculiar gaseous matter, which I have named ozone, and shown to be formed out of oxygen, when subjected to electrical influences.

The most striking proof of the correctness of my statement, is the fact, that chemically pure oxygen, or atmospheric air, when enclosed within a tube or small bottle, and exposed to the action of electrical sparks, becomes ozoniferous, *i. e.*, permanently assumes the odour perceived near electrical points, or in the neighbourhood of electrical batteries at the time of their discharge, or at places which happen to be struck by lightning, or near dry glass plates when rubbed in atmospheric air, or at the positive electrodes, when water is electrolysing, or, also, when moist rarified oxygen, or atmospheric air, at the common temperature, is kept in contact with phosphorus. There cannot, therefore, any longer be a question regarding a truly electrical smell, *i. e.*, whether electricity immediately affects the olfactory nerves.

As to the sour taste which is perceived when electrical sparks are caused to pass, either from negatively- or positively-charged conductors, to the tongue, it may also be considered as a matter of certainty, that it is not an immediate effect of electricity, but is due to some nitric acid; which, under electrical influence, is formed out of the con-

stituent parts of the atmospheric air, through which the electrical sparks happen to pass.

The correctness of this statement is proved, in the first place, by Cavendish's experiment, or, what comes to the same, by the fact that litmus paper becomes red, or a band of filtering paper, when impregnated with a solution of potash, becomes nitriferous, if they be for a certain time exposed to the action of electrical sparks passing through atmospheric air.

For these reasons, we may safely assert that electricity would affect neither the nose nor the tongue, if atmospheric air did not happen to contain oxygen and nitrogen; though, to my knowledge, this has not yet been experimentally demonstrated.

As to the phenomena of sound and light, so frequently perceived by our ear and eye during electrical discharges, there can be hardly any doubt that electricity has nothing to do with them directly, and that they are due to the vibrations into which the particles of air, &c., happen to be thrown by the electrical discharges.

Whether the best known and most peculiar sensations called forth in the nerves of touch (the electrical shock in all its various degrees), are to be considered as a primitive effect of electicity, I am not prepared to say; it is, however, very possible that the proximate cause even of that physiological phenomenon, may be something different from electricity, and that this agent, as such, may have no power of acting directly upon any organ of sensation.

Before proceeding farther, I may, perhaps, be allowed to draw the attention of my medical hearers to a fact, which, in relation to the question before us, is worthy of their most attentive consideration.

All the effects called electrical, such as the chemical combination, or the separation of elementary bodies, the generation of heat, light, and magnetism, the contraction of muscles, &c., are not produced by what is called statical electricity. These phenomena are only called forth when the state of electrical antagonism, excited in some way or

other, in ponderable matters, is in the act of disappearing, or, as it is usually expressed, when both the electricities are uniting.

Of the effects produced, either by positive or negative electricity, when in their tensional condition, we know nothing, if we except their inductive actions.

After having made these introductory remarks, I think we are fully prepared to enter into the details of our principal subject. My own experiments, and those of De la Rive, Marignac, Berzelius, Erdmann, and Marchand, have, I think, satisfactorily demonstrated, that pure or atmospheric oxygen, on being exposed to the action of electrical sparks, is transformed into that odoriferous matter which the eminent philosophers mentioned, have declared to be nothing but an allotropic modification of common oxygen; whilst I have hitherto been inclined to consider it as a peculiar peroxide of hydrogen, being, in many respects, similar to Thenard's oxygenated water. But I will not conceal from my hearers, that the results of the researches I have of late instituted, with a view of settling the question of the chemical nature of ozone, are rather in favour of De la Rive's and Berzelius' views than of my own opinion; but, notwithstanding, I do not yet venture to pronounce my final judgment upon the subject. As to the point, however, with which we are now occupied, it luckily matters very little which of those divergent opinions may be correct, for we have, at present, to deal with the effects only, and not with the nature of ozone.

As for the chemical character of this enigmatical body, we may say that it is the most powerful oxidising agent we as yet know of, transforming, in the cold, even silver into the peroxide of that metal, iodine into iodic acid, nitrogen (a strong base being present) into nitric acid, the "-ous" acids into "-ic" acids, the "-ites" salts into "-ates" salts, the metallic sulphurets into sulphates. Ozone destroys, instantaneously, sulphuretted, seleniuretted, phosphoretted, iodu-retted, arseniuretted, and stibiuretted hydrogen, oxidising their constituent parts; it eliminates iodine from a number

of iodides; it changes the yellow prussiate of potash into the red cyanide, precipitates from the salts of the protoxide of manganese their base, in the shape of wad or hydrate of peroxide of manganese, &c.

Ozone also acts powerfully upon most organic matters, in consequence of which, like chlorine, it discharges the colour of the organic pigments, and is rapidly taken up by a variety of vegetable and animal substances, such as albumen, casein, fibrin, glue, blood, starch, vegetable fibrous matters, &c. Ozone possesses an eminent electro-motive power, being similar to that enjoyed by chlorine, bromine, iodine, and a number of metallic peroxides. But what must make ozone most interesting both to the physician and physiologist, are the physiological effects produced by this subtle agent upon the animal system. These effects are, as we shall presently see, very similar to those of chlorine and bromine.

When I began my researches on the chemical generation of ozone about ten years ago, I frequently inhaled strongly ozonised air, and the consequence was a really painful affection of the chest, a sort of asthma, connected with a violent cough, which forced me to discontinue, for a time, my investigations.

I do not doubt, therefore, for an instant, but that pure ozone, in spite of its being (according to De la Rive and Berzelius) nothing but allotropised oxygen, would act as a most powerful poison, and would quickly destroy the strongest animal life, if exposed to its action. At least, I saw that mice, when placed in strongly ozonised air, died in a very short time.

The facts just mentioned render it, I think, quite certain that ozone (perhaps on account of its exalted oxidising powers) is a poisonous substance capable of producing, even in minute doses, deleterious effects upon the system when introduced into the lungs,—effects very like those caused by chlorine or bromine.

If by some natural cause, chlorine, for instance, should happen to be thrown into, or be formed within, the atmosphere, at different times in different quantities, what chemist

or physiologist could, for a moment, doubt that such atmospheric chlorine would produce chemical and physiological effects proportional, as to their amount, to the quantity of the chlorine happening to exist in the atmospheric air at those times?

As a fact, certainly, no such chlorification of the atmosphere takes place; but, in consequence of electrical discharges continually going on in the atmosphere, ozone, a chlorine-like substance, is incessantly formed there out of atmospheric oxygen. My ozonometric observations show that the quantity of ozone present in the atmosphere at the same place, varies at different times, bearing, very likely, some ratio to the amount of the electrical discharges taking place at a given time, and also depending, in some measure, upon the direction of the currents of air.

If, at given periods and places, comparatively large quantities of ozone happen to be formed, and, for some time, inhaled, I think we have as little reason to wonder at the sensitive mucous membranes becoming then irritated or inflamed, as we have to be surprised at seeing paste of starch containing some iodide of potassium turned blue, after having been exposed, for some time, to the action of that ozoniferous air. After ascertaining the identity of the ozone produced, by means of phosphorus, out of common or atmospheric oxygen, with that produced by electrical sparks passing through the same sort of oxygen; and, farther, after finding out that the ozone, which was chemically produced, acted powerfully and injuriously upon the system, and after convincing myself, at last, that there are always appreciable, though varying, quantities of ozone to be met with in the atmosphere, I could not help conjecturing that that ozoniferous atmosphere would produce, upon the animal constitution, effects, lesser or greater, according to the quantity of ozone existing in the air for the time being. I hardly need say that I suspected certain catarrhal affections to be the principal physiological effects brought about by atmospheric ozone. To test, as far as my limited means enabled me, the correctness of this view, I induced, some years ago,

several physicians of Bâsle to compare with me the lists of their catarrhal patients with the tables of my atmospheroozonometric observations, and we could not help being struck at the coincidence of what I called my blue days, with an unusual number of catarrhal cases. I am, of course, very far from thinking that the matter is decided by those insulated observations, for we cannot arrive at certainty, unless we multiply these comparative observations. It seems, therefore, to me to be highly desirable that physicians and physiologists should, in many different places, and under a variety of circumstances, make comparable atmospheroozonometric observations,[1] making them simultaneously, with the observations on the frequency of catarrhal affections, &c. I hardly need remark, that the temperature and moisture of the atmosphere, the winds and their directions, &c., should not be left unnoticed.

That very minute quantities of certain substances have the power of acting most energetically upon the system, is a well-known fact, and we have good reason to suspect that, now and then, poisonous matters are spread through our atmosphere; but, to my knowledge, no such matter has as yet been found there with satisfactory certainty. Now, as I cannot entertain any doubt that ozone is a regular constituent part of free atmospheric air, it seems to me that this substance yields, as it were, a handle, which ought to be laid hold of for instituting researches on the terra incognita of miasmatic bodies. I therefore recommend the subject to the attention of physicians and physiologists.

I shall proceed in my attempt to show that the electrical condition of the atmosphere is most likely intimately con-

[1] Mr. Bürgy, bookbinder, of Bâsle, makes ozonometers according to my directions, for a few shillings a piece. Such an ozonometer consists of a box holding bands of ozone test-paper, bound up into thirteen packets; twelve of these packets contain sixty bands each, and one thirty only; these are calculated for making two observations a day, during twelve months. A chromatic scale and instructions for using the ozonometer are added. Mr. Newman, the instrument maker in Regent-street, will prepare the same test-paper.

nected with another subject, also highly important in a physiological point of view.

ON MIASMATIC SUBSTANCES.

By miasmatic substances I understand gaseous or vapourous matters which prove deleterious to the system, if inhaled even with large volumes of air; such poisons are produced and thrown into the atmosphere either by purely chemical, or physical, or physiologically chemical actions, taking place within the earth, or upon its surface, in stagnant or moving waters, or in the atmosphere itself.

It is well known that we may artificially produce a number of gaseous inorganic substances, minute quantities of which have the power of poisoning atmospheric air and of making it entirely unfit to sustain animal life. Sulphuretted, seleniuretted, phosphoretted, arseniuretted, and stibiuretted hydrogen are examples. Those gases, being distinguished by a high degree of oxidability, owe, perhaps, their poisonous character to that chemical property. There is another set of gaseous or vaporous bodies, minute quantities of which also act energetically upon the animal system, and which may, in some respects, be considered as the chemical antipodes and antidotes to the gases before mentioned, instantaneously destroying the latter and being highly oxidising agents. Such substances are—ozone, chlorine, bromine, and iodine, the chemical, voltaic, and physiological properties of which, in many respects, closely resemble each other.

As to the first set of the gaseous matters named, none of them, sulphuretted and perhaps phosphoretted hydrogen excepted, are produced by a natural cause and thrown into the atmosphere. And even those two gases are engendered in such very minute quantities, that with the exception of a few localities, they cannot exert any general influence upon animal life.

Of the second set there is certainly one, which in appreciable quantities is met with in the atmosphere, namely, ozone. But there exists an inexhaustible source from which mias-

matic substances are abundantly and unremittingly flowing into the atmosphere, and that source is the infinite number of plants and animals daily and hourly dying away within and upon the earth, in the seas and other waters, and even in the atmosphere. An immense quantity of organic matter constituting those vegetable and animal substances, so soon as life has departed from them, undergoes a variety of chemical changes, in consequence of which carbonic acid, ammonia, in many instances carburetted, sulphuretted, and phosphoretted hydrogen, are produced. But besides these compounds which are sent into the atmosphere, a number of gaseous substances are formed whose chemical nature is, as yet, entirely unknown. Of these matters we have, however, some reason to admit that if mixed up even with large quantities of atmospheric air and introduced into the lungs, they produce very deleterious effects upon the system.

If we are allowed to admit that such deleterious gases are disengaged from putrefying organic matters, we shall also, I think, be permitted to consider putrefaction as one of the principal causes of the pollution of the atmosphere by miasmatic substances.

If we consider that the putrefaction of organic matters is constantly going on, on almost every point of our globe, it can hardly fail that in the process of time, the miasmatic gases, small as their absolute quantity may be with reference to the immense bulk of the atmosphere, would accumulate so much, as to render the latter poisonous and unfit for sustaining animal life, if nature had not contrived some general arrangement for destroying those miasmatic substances again.

The question now arises, what means nature employs for arriving at that end.

I am inclined to believe that the ozone, which is formed under the influence of atmospheric electricity, amongst other functions, performs that work of destruction, so important to animal life: and the reasons that make me entertain such a notion are the following:—

Ozone, as already mentioned, is an agent of high oxidising

power, acting even in the cold not only upon most of the inorganic oxidable matters, but also upon almost all organic substances, and changing their chemical constitution, conjointly with their physiological properties.

With the view of testing the destructive power of artificially prepared ozone upon the miasmatic gases, disengaged from putrefying animal matters, I suspended, within a bottle holding about sixty litres, a piece of flesh, which was in a high state of putrefaction, and weighing about four ounces. After the flesh had remained for one minute only in the vessel, its atmospheric air was so strongly charged with the flesh miasma as to exhibit a most fetid and nauseous odour.

To produce ozone, I put into the bottom of the miasmatised bottle a piece of phosphorus, about one inch long, covering half its bulk with water, and exposing the whole to a temperature of 18—20° C. For comparison's sake, another bottle holding pure atmospheric air was provided with phosphorus and water to generate ozone. After a few minutes, I could detect, by means of my test-paper, the presence of ozone in the last vessel, whilst in the miasmatic bottle, no ozone could be observed, but still the fetid odour was perceived. After the lapse of about twelve minutes, however, the fetid smell had entirely been destroyed; free ozone then made its appearance.

From these facts I draw the conclusion, that the first portions of the ozone which was produced in the miasmatic bottle, were employed for destroying the miasma, *i. e.* oxidising its constituent parts, free ozone only making its appearance when the last particle of the miasmatic gas had been destroyed.

The power of ozone to destroy the miasma disengaged from putrid flesh, was exhibited in a still more striking manner by the following means:—The air of a bottle holding sixty litres was so strongly ozonised, as almost instantaneously to colour dark blue the moist test-paper, on its being introduced into the vessel. The phosphorus was then removed, and the bottle cleaned with water; a piece of

strongly putrid flesh, weighing about four ounces, was introduced into the ozoniferous vessel, and it could remain therein for fully nine hours before the ambient air assumed the slightest fetid odour. During that space of time, from half-hour to half-hour, I tested the air of the bottle, and found, indeed, its ozone continually diminishing; but as long as the test paper indicated the presence of free ozone, the most delicate nose could not perceive the slightest fetid smell within the bottle. So soon, however, as the test-paper was no longer acted upon, the nauseous odour began to make its appearance.

From these experiments we learn that all the miasmatic substances which were produced by the putrid flesh, in the course of nine hours, were completely destroyed by the ozone contained in the bottle of sixty litres' capacity.

Now, if we admit that the disengagement of the miasmatic matters were uniform during the course of the nine hours, we are allowed to conclude that those four ounces of putrid flesh would have miasmatised $9+60=540$ bottles, or 32,400 litres of air just as strongly as 60 litres of air were impregnated with miasma, within a minute, by the same four ounces of flesh.

But what was the weight of the ozone that disinfected 32,400 litres of such fetid air, or destroyed the miasma, which was emitted during nine hours by the four ounces of the putrid flesh? According to my former experiments, 60 litres of air being as strongly as possible ozonised, are capable of transforming about 87 milligrammes of silver into the peroxide of that metal, which requires 13 milligrammes of oxygen. Whether ozone be an allotropic modification of common oxygen, or whether it be a peroxide of hydrogen, it is certain that the 13 milligrammes of chemically-excited oxygen which was contained in the ozonised air of the bottle, and was capable of transforming 87 milligrammes of silver into the peroxide, destroyed by oxydation the miasma, which in nine hours was disengaged from the putrid flesh.

Whatever the chemical nature of that miasma may have

been, we are, at any rate, allowed to assume that its weight must have been proportional to the quantity of ozone by which it was destroyed. Now, the quantity of ozone which did that work having been so very minute, the weight of the miasmatic substance destroyed by it cannot have been much larger.

To convey to my hearers a still more distinct idea of the extreme minuteness of the quantities which are concerned in the miasmatic experiments mentioned, I will give some further data.

Sixty litres of atmospheric air weigh about 78,000 milligrammes, and contain, if strongly ozonised, (by means of phosphorus) about 13 milligrammes of active oxygen, *i. e.*, $\frac{1}{6000}$ of ozone; from whence, and from the experiments before mentioned, it follows that atmospheric air, containing but $\frac{1}{6000}$ of ozone, has the power of disinfecting 540 times its own volume of air, which is as strongly loaded with miasma as 60 litres of air become by four ounces of highly putrid flesh within a minute: or what comes to the same, atmospheric air, containing but $\frac{1}{3240000}$ of ozone, is able to disinfect its own volume of such miasmatic air.

From these statements it appears, that in miasmatic substances, though still affecting very strongly the sense of smell, we have to deal with infinitesimal quantities of matter; and it follows farther, that extremely minute quantities of ozone are required to be formed in the atmosphere, in order to destroy the oxidable miasmatic bodies thrown into it by putrefying organic matters, those miasmata making up (as to quantity) but a very small portion of the rest of the product of spontaneous putrefaction.

That ozone occurs in atmospheric air, is a natural consequence of the formation of that principle by electrical discharges, acting on atmospheric oxygen; and that ozone is present in the atmosphere, can directly be proved by means of my test-paper.

We may therefore conclude, that the electrical discharges, constantly taking place in different parts of the atmosphere, and engendering ozone, indirectly purify it from the oxidable

miasmatic gaseous matters with which it happens to be continually contaminated, and maintain it in that condition which is compatible with the sustenance of animal life.

By means of atmospheric electricity, nature has, as I think, established a process, through which she arrives on a large scale at the same end, which we try to get at in a small way by chlorine fumigations; or to express myself more distinctly, atmospheric ozone is continually produced for the purification of the atmospheric ocean, which is incessantly infected by miasmatic gases, just as chlorine may be produced for the disinfection of small volumes of air containing miasmata.

And as nature so well knows how to arrive by simple means at a variety of ends, so in this instance. For if the oxidable miasmata be destroyed by atmospheric ozone, which itself is a miasmatic principle, that ozone, *vice versâ*, also suffers destruction by those miasmatic matters; this is one of the reasons why atmospheric ozone, although it is continually engendered, cannot, in general at least, accumulate in the atmosphere to an extent which is dangerous to animal life.

It is a very old popular opinion, that thunderstorms are capable of purifying the atmosphere; and I think there are some grounds for entertaining that notion.

As we now know, that during a thunderstorm comparatively large quantities of ozone are formed, we can easily conceive in what manner such a purification may be brought about. The deterioration of atmospheric air which is supposed to take place in the hot season, may possibly consist only in an accumulation of miasmatic gases (principally resulting from the putrefaction of organic matters) in the lower regions of the atmosphere; and the purification of the air can be effected only by the destruction of those miasmatic gases. Now, as ozone is abundantly produced by thunderstorms[1] that principle will act like chlorine, and will

[1] I must not omit to mention here an interesting observation made by the excellent Swiss engineer, Mr. Buchwalder, who communicated it to me. This gentleman, having for years been engaged in surveying our Alps, had

purify the air in which those electrical phenomena take place.

It is possible and even probable, that sometimes (under given circumstances and in certain localities) a disproportion will occur as to the quantities of ozone and oxidable miasmatic gases which are engendered at the same time, so that the quantity of atmospheric ozone may not be sufficient to destroy all the miasmatic matter arriving in the atmosphere. Now, according to the chemical quality (physiological properties) and the quantity of that surplus of miasmatic matters, more or less perceptible effects will be produced upon animal life, that is, some kind of epidemic will, to a greater or lesser degree, prevail.

As indicated by my test-paper, the atmosphere is usually more or less ozoniferous; hence it follows that oxidable miasmatic matters, such as sulphuretted hydrogen, the fetid gases emitted by putrefying flesh, &c., can no more exist in that ozoniferous air, than they could exist in air containing the slightest traces of free chlorine.

I do not know whether the assertion be true, that during the prevalence of certain diseases, such as cholera, the atmosphere is deficient of ozone; but nothing can be easier than testing that assertion.

I have still to speak of some facts which, in my opinion, are worthy of the attention of physicians and physiologists.

many opportunities of observing, in the immediate neighbourhood, and even in the very midst of thunderstorms, the grand and awful effects produced by the electricity of the clouds.

One day, when Mr. Buchwalder was on the summit of the Senlis (near Appenzell), and was couched with his servant under a little tent, which was pitched upon a field of snow, on a sudden he was enveloped by a thick electrical cloud, from which lightning proceeded in all directions. One flash struck the master and the servant; it instantaneously killed the latter, and immediately afterwards the tent was filled with a very strong and peculiar odour. When Mr. Buchwalder visited me in my laboratory, he happened to smell strongly ozonised air, with which I was just then experimenting; and without any hesitation the engineer declared that the odour of that air was perfectly identical with the smell perceived by him in his tent upon the heights of the Senlis.

As far as my own observations go, above all other seasons winter is most distinguished by the abundance of atmospheric ozone; from which fact we may conclude, that in winter time the atmosphere must be freest from oxidable miasmatic matters.

I have also ascertained the remarkable fact, that the higher strata of the atmosphere are more ozoniferous than the lower ones. Having made experiments on different heights of the Jura mountains, 12—1800 feet above the level of Bâsle, I invariably found that my ozonometer exhibited there higher ozonometric degrees than it did at the same time in Bâsle. Hence we may infer, that the higher regions of the atmosphere contain less oxidable miasmatic matter than those which are nearer the surface of the earth. Now, as the generation of some diseases, such as the yellow fever, &c., seems to be connected with certain seasons and geographical positions, it would, I think, be worth while to ascertain, by comparative ozonometric observations, whether certain diseases bear any relation to the ozoniferous state of that portion of the atmosphere within which they happen to occur.

Considering the great obscurity in which the causes of most diseases are as yet enveloped, and as it is, nevertheless, highly probable that some at least, if not many of them, are the effects of chemical agents which exist in the atmosphere, and have a great physiological effect, *i. e.*, act in most minute quantities with great energy upon the animal constitution, scientific physicians and physiologists should earnestly follow out any train of research which promises to increase our insight into the connection between abnormal physiological phenomena, and physical or chemical agents.

One remark more and I have done.

By a series of experiments, I think, I have satisfactorily proved that the ozone, which is produced out of pure or atmospheric oxygen by electrical sparks, is, in every respect, identical with that ozone which is engendered out of pure or atmospheric oxygen by the means of phosphorus, or with

the ozone which is disengaged at the positive electrode during the electrolysis of water. On this account, we cannot entertain the slightest doubt, that electric and voltaic, as well as chemical ozone, has the power of destroying oxidable miasmatic gases; but to remove even the slightest shade of doubt on the subject, I have experimentally convinced myself that they have the same action.

If a small inclosed volume of pure oxygen or atmospheric air, which has previously been strongly charged with miasmata by putrid meat, be subject to the action of electrical sparks, it will soon become disinfected; and on mixing up miasmatised oxygen or atmospheric air with a sufficient quantity of ozoniferous oxygen, obtained from water which has been electrolysed, the same effects will be produced.

ON THE EMPLOYMENT

OF

THE HEAT OF ELECTRICITY

IN PRACTICAL SURGERY.

BY

JOHN MARSHALL, F.R.C.S.

ASSISTANT-SURGEON TO THE UNIVERSITY COLLEGE HOSPITAL.

COMMUNICATED BY

RICHARD QUAIN, ESQ., F.R.S.

Received April 7th.—Read April 22d, 1851.

The object of the present paper being to direct the attention of the Profession to the employment of the Heat of Electricity in Practical Surgery, I will, in the first place, describe the case, by the peculiarities of which its application was originally suggested.

Early in September last, (1850,) Richard W. H—, a native of London, aged 25, of delicate constitution and strumous habit, who had chiefly resided in the metropolis, and had been for some years engaged therein as a linen-draper's shopman, came under my care, as an out-patient, at the University College Hospital, with an obstinate fistula in the right cheek, resulting from a succession of abscesses. According to the statement which he made, it appears that in November, 1849, (being then out of health,) he was first troubled with a swelling of the cheek, the cause of which he does not know. For a period of nine or ten weeks, the swelling became alternately better and worse—being some-

times, after the use of fomentations and purgatives, reduced to a small lump the size of a bean,—and at other times, enlarging even in the course of a couple of hours, so that the mouth could hardly be opened. Up to the beginning of February, this swelling had caused more inconvenience than pain; but the cheek then became so swollen, stiff, and painful, that he applied to Mr. Ancell, who discovered a small deep-seated abscess, which after three or four days, was opened by an incision inside the cheek. During the next four weeks, the discharge continued, and it became necessary, owing to further suppuration in the neighbourhood, to make other incisions, and ultimately to unite them on the inner surface of the cheek. About the middle of March, the cheek again swelled, so as nearly to close the right eye, and a fresh formation of pus, accompanied by constitutional disturbance, took place,—on this occasion tending towards the skin, which became much inflamed. Two separate punctures through the integument, made at different times, were found necessary to evacuate the accumulated pus, and soon after a large probe could be passed quite through the cheek, the passage having two small external orifices and one long internal opening. Finally it became necessary to lay open the two outer orifices into one.

By the use of poultices, lotions for the mouth, occasional purgatives, and a course of tonic medicine, the suppurating cavities in the cheek gradually diminished, and, together with the external and internal wounds, became so contracted, that there remained merely a narrow fistulous passage leading into the mouth. Two or three times, in the early part of May, the external orifice of the fistula temporarily healed, but the cicatrix always became again inflamed, and was burst through by matter accumulating behind it; while the discharge from the inner opening never entirely ceased. About the beginning of June, as the fistulous passage did not heal, it was thought advisable to try the effect of improving the general health, and Mr. H— was sent to Margate, where he attended, as an out-patient, at "The Royal Sea-bathing Infirmary," under the care of Mr. Field. Here,

besides proper medical treatment, he took sea-baths, an Iodine ointment was applied to the face, and an Iodine injection made use of to stimulate the walls of the fistula. Once or twice, the outer wound again closed up, but only for two or three days. At the end of six weeks he left Margate, very much more vigorous in health, but (understanding from Mr. Field that probably even a six months' residence there would not suffice to cure the fistula) he returned to London, and very soon after, an increased discharge escaped from both ends of the fistulous passage, which was pronounced by Mr. Ancell to be as intractable as ever. It continued in the same state until the 3d of September, when I first saw the patient at the Hospital.

At that date, I found on the right cheek, behind the angle of the mouth, a puckered depression, at the bottom of which was an elevated and inflamed cicatrix, about an inch long and a quarter of an inch wide; on the fore-part of the cicatrix a small fungous granulation marked the principal orifice of the fistula. About half an inch behind this was a smaller orifice, apparently quite recently ulcerated, which led into the side of the fistulous track. On the inside of the cheek, a long cleft extended backwards on a level with the lower molar teeth. At the further part of this cleft, opposite the second molar tooth, a fleshy projection indicated the internal fistulous orifice. The direction of the fistula was at first obliquely inwards through the skin, then backwards, and then inwards again into the mouth; its length was $1\frac{3}{4}$ inches; it would only just admit a fine probe, and was somewhat narrowed at either orifice. The tissues around it were hard, but not tender on pressure. A small quantity of a very thick whitish, almost curdy pus, escaped from both ends of it. Its position was altogether below the Stenonian duct, and no saliva ever flowed through it. The patient was at this time rather thinner than usual, and appeared anxious and miserable. The constant discharge and unsightly dressings annoyed himself and others, and rendered him objectionable, and even unfit for his situation as a shopman.

Finding that the pus was somewhat pent up in the fistula, I enlarged the principal external orifice by about a quarter of an inch, and then, with a view of stimulating the lining membrane and maintaining a free exit for the matter, it was injected with a solution of Sulphate of Copper, and some threads of lint, moistened with the solution, were introduced into it. Under this treatment, in about three weeks, the hinder of the two external openings completely closed up, but the main fistulous track showed no disposition to heal. Other injections containing Sulphate of Zinc, Nitrate of Silver, or Iodine, and ultimately the solid caustic, were successively tried, being frequently used by myself, so as to ensure their efficient application. In the mean time, he took wine and porter, Quinine and Sulphuric Acid, and afterwards Quinine and Iron. His strength improved, the local stimulants employed produced increased action along the fistula; but even after six or seven weeks there was no disposition to adhesion of its sides.

After such persevering trials on the part of others as well as myself, it appeared probable that the treatment hitherto adopted would not succeed in closing a fistulous passage, the condition of which had undergone no material improvement for more than six months. The patient, moreover, becoming dispirited, it became necessary to try some other method, and I proposed to revive the inner surface of the fistula either by the actual cautery, or by dissecting out the callous tissue along it, and bringing the cut surface together by hare-lip pins and sutures. The former of these two methods seemed in every way preferable, but it was obviously difficult, or I might say impossible, effectually to cauterize, by the ordinary hot wire, the whole length of an extremely narrow and winding passage, nearly two inches long, through which a fine probe could only be insinuated by tedious manipulation; and cauterization of the accessible part only of the fistula, would probably have ended in no permanent advantage. It then occurred to me that a piece of platinum wire, which might be easily passed through the narrowest and most tortuous passage, might, by being made to form part of the

circuit of a powerful galvanic battery, be so intensely heated throughout its whole length, while still lying in the fistula, as most effectually to cauterize every portion of its inner surface.

No rational objection appearing to this plan, I commenced by making some preliminary experiments on both dead and living animal tissues. In these trials, the objects held in view were:—

1st. To ascertain the possibility of obtaining a sufficiently equable cauterizing heat along the whole length of a wire in contact with a moist conducting substance, like animal tissue.

2dly. To determine the nature and extent of the effect produced on the tissue itself, and its consequences, both immediate and remote, in the living animal.

3dly. To learn by actual trial, before operating on the human subject, the size of wire best suited to accomplish the desired purpose, the battery power requisite to heat the wire under the peculiar circumstances, and the length of time during which the electric current should be allowed to traverse it.

4thly. To familiarise one's self with the practice of cauterization by this mode, so as to be able to adopt such contrivances and precautions as experience might suggest.

The experiments were made with a Grove's battery of four cells, each having a platina surface of thirty-two, and a zinc surface of thirty-eight square inches. Fine platina wire was the agent employed to localise the electric heat. On dead animal matter, it was found that a tubular portion of the tissue was destroyed immediately around the whole length of the imbedded portion of the wire, the thickness of tissue cauterized being somewhat greater at either end than towards the middle of the imbedded wire; the depth to which the cautery reached, depending on the power of the battery, the size of the wire, and the duration of the current, was, therefore, entirely under control. A few seconds only were required to destroy, effectually, the surfaces in actual contact with the heated wire. In the living animal,

a rather longer time was needed to produce corresponding effects, but no mischief from laceration or bursting of the tissues, or from shock to the general system, arose. The operations were performed on a rabbit and dog, placed under the influence of chloroform, and consisted chiefly in the perforation of considerable thicknesses of the soft parts. Inflammation along the course of the cauterized track, separation of tubular sloughs thrown out at either orifice of the wound, and active granulation and suppuration, occurred in rapid succession, and finally the wounds, in all cases, quickly healed.

The practicability and safety of cauterization by the heat of electricity being thus established, I proceeded, on the 5th of November, in the presence of Professor Sharpey and Dr. Ditchfield, to submit my patient to the following operation. The same battery was employed as before. One of the poles was interrupted, the broken end terminating at a mercury cup; a fine platinum wire, $\frac{1}{50}$th of an inch thick, was passed leisurely, and without producing pain, through the fistula, until it appeared in the mouth of the patient. The part of the wire outside the cheek was then twisted on to one of the stout copper poles of the battery, whilst the other end, visible at the inner orifice of the fistula, was brought into contact with the other pole, which, for that purpose, was passed into the mouth. During these arrangements, the circuit of the battery remained open. The patient, who had not taken chloroform, was now desired to keep quiet and allow his head to be firmly held. The galvanic circuit was then closed by dipping the interrupted pole into the mercury; when the platinum wire instantly became heated; and, at the expiration of nine seconds, the circuit was broken, the cauterization being supposed, from previous experience, to be, by that time, sufficiently complete. The poles of the battery being then removed, the platinum wire was found to cling slightly to the cauterized sides of the fistula, so that two fingers were held on the cheek whilst it was carefully withdrawn. Both orifices of the fistula would now have admitted a crow-quill,

and were surrounded by a well-defined, opaque, whitish eschar. The patient expressed himself surprised at the small amount of pain produced by the operation; he had felt a sense of burning upon his cheek, and of pricking within the mouth; but no pain along the fistulous track. About five or ten minutes afterwards he went away, feeling nothing beyond a sense of stiffness in the cheek.

On the next two days, a little swelling and redness appeared along the course of the fistula, accompanied by the escape of a thin, brownish fluid. On the fourth day the sloughs visible at either opening were loosening; that at the inner orifice came away on the fifth day, that at the outer on the sixth day. The swelling of the surrounding parts aided in extruding the sloughs, and also in bringing together the sides of the fistula, the inner surface of which was now secreting healthy pus. The quantity of this secretion gradually diminished; on the eighth day the inner opening was no longer distinguishable; and on the 16th November, the eleventh day after the operation, the external opening was also soundly and permanently cicatrized.

About a week after this, a slight stiffness and swelling came on in the back part of the cheek; and a small quantity of thick curdy pus, was again found escaping into the mouth from the deep cleft previously described on the inner side of the cheek. I thought the fistula had reopened; but it was not so. On examination I found a small opening, at the back part of this cleft, from which a single drop of pus could be squeezed by pressure over the middle of the masseter muscle; this opening led into a narrow blind pouch, or sinus, which had hitherto escaped my observation, and which extended backwards for nearly an inch by the outer side of the lower jaw-bone. As this sinus was probably lined by the same indolent substance as the fistula which had already been obliterated, I proposed to cauterize its interior, and on the 14th of December, an attempt was made to accomplish this, by introducing into it a piece of platinum wire doubled back upon itself so as to form a close bend, along which the electric current was made to

pass, its two ends being previously connected with the two poles of the battery, which were carried into the mouth. The operation was continued for ten seconds only, but it did not prove successful; and accordingly, on the 18th of December, I repeated it in the same manner, the electric current being allowed to flow for fifteen seconds. The wisdom tooth, which rather crowded the jaw, was also extracted by my friend Mr. Samuel Morris, who assisted me at the time. The cautery produced rather more pain than in the first operation, a very thick slough was thrown out, and the sinus finally closed in somewhat less than a fortnight. During the progress of the cure, and for some weeks subsequently, good diet, wine, and tonics were prescribed. Up to the present date, March 22d, 1851, the cheek has continued quite sound, and the deep puckering of its outer surface is fast disappearing.

The case just related satisfactorily illustrates the peculiar advantages of the method of cauterization by means of the heat of electricity. The *electric cautery*, as it may conveniently be called, has the recommendation of being under proper care, intense, rapid, certain and uniform. It is simple and easy of application; for the wire, or other substance to be heated, may be duly and deliberately adjusted, whilst yet unconnected with the source of heat: its employment is unaccompanied by the terrors of a formidable apparatus, as the battery may be placed in an adjoining room: it may be used in deep-seated parts, and under many conditions in which no other cautery could be applied: its effects may be carefully measured, and are completely under control, being immediately arrested by breaking the galvanic current: it is so limited in its action as to cause no unnecessary destruction, or injury to adjacent parts; and lastly, its use appears to be safe, and its consequences favorable.

It may here be mentioned, that subsequently to the cure of the above-mentioned fistula, my attention was called to the fact that M. Fabré Palaprat had already used a platinum wire heated by galvanism for producing deep-seated moxas.

His method is described, though not very intelligibly, in Becquerel's 'Traité de l'Electricité,' 1836, vol. iv, p. 306, but it is not stated that M. Palaprat employed it, or even recommended it, as a curative agent in the treatment of surgical disease.

For all such cases, however, in which potential cauterization may be advisable, and in which neither the common heated wire nor button is available, the electric cautery will, I feel assured, be employed with advantage, as, for instance, in obstinate fistulæ, leading into the mouth, or communicating with the trachea; in intractable perineo-urethral or recto-urethral fistulæ; for cauterizing the edges of vesico-vaginal fistulæ, or the internal surfaces of long sinuses, resulting from abscesses, or from incompletely obliterated cysts; for arresting hæmorrhage in certain parts, otherwise difficult of access; for uniformly cauterizing deep poisoned wounds, and in other conceivable instances.

But during the progress of my experiments, another and very different application of the electric cautery suggested itself, viz., that of employing the incandescent wire in the *section* of soft parts in the living body. In the experiments on dead animal tissues, I had found that a considerable thickness of muscular substance could be cut through by the heated wire in a few seconds; and I had further ascertained, in the living animal, that no hæmorrhage occurred, from the division, by the hot wire, of veins as large as a crow-quill, or of arteries a very little smaller.

It seemed probable, therefore, that it would be simple and safe to apply this method for the removal of redundant vascular parts, instead of the knife, scissors, or ligature; as, for example, in hæmorrhoids, both external and internal; polypi of the uterus; and certain forms of erectile tumours, or any other soft pedunculated growths. For extirpation of diseased portions of the tongue or of the os uteri, it also appeared likely to be useful. Moreover, in certain peculiar cases, where simple division of the tissues alone was required, it seemed worthy of trial, as in the various kinds of rectal fistulæ, or in fissure of the anus. As a means of obliterating

varicose veins, it might also prove safe and efficacious. Lastly, in the case of persons having a strong hæmorrhagic tendency, this mode of dividing the soft parts appeared to offer great advantages.

It was evident that the application of the actual cautery to such purposes, would be open to the objection of returning to a means of cure already abandoned as barbarous; but the peculiarities of this method of cauterization appeared to give such a command over the agent to be employed, as had been hitherto impracticable. I have accordingly used it in four cases of rectal fistulæ; in five cases of internal hæmorrhoids; in two cases of external hæmorrhoids, and in one of fissure of the anus. As some of these cases are still under treatment, and as their number is yet too inconsiderable for the purpose of fully testing a method so entirely new and open to improvement, I propose to defer, till another occasion, a statement of the results of these and of such other operations as I may hereafter have the opportunity of performing. In the meantime, I may state, that no bad consequences have followed in any case, and that, at present, all have been attended with success.

Description of the apparatus employed, and of the mode of operating.

The apparatus necessary for operations by the Electric Cautery consists of a moderately powerful galvanic battery, fitted up with flexible poles, one of which is interrupted at a mercury cup; of terminal copper holders for the cauterizing wire; and of platina wires of various thickness, fitted up with plates or balls of the same metal, if required.

The kind of battery is quite indifferent; but I have used, on the ground of economy and simplicity of arrangement, one composed of iron and zinc on Sturgeon's principle, which, as a long-continued current is never needed, answers perfectly. Each cast-iron cell has about 120 square inches of surface, whilst each zinc element has 96. Four, six, eight, or nine such cells are used, according to the length of wire required to be heated. The nine cells will heat 4 inches

of platina wire $\frac{1}{36}$th of an inch thick in two seconds, and 6 inches in four seconds. The acid employed is one part of sulphuric acid to ten of water. This battery being, however, objectionable, from its size and weight, from the necessity of fixing the elements every time it is used, and from the large quantity of fluid employed, I am now having constructed one of a different form, which will be more compact and lighter, having the elements permanently fitted, and requiring, moreover, very little acid to work it.

The poles, which are necessarily stout, and which, therefore, if composed entirely of copper, would be very stubborn, may be made flexible by having a part of each composed of a column of mercury enclosed hermetically in a vulcanised indian-rubber tube, into each end of which the copper part of the pole is to be fitted. Moreover, one pole should be interrupted at a mercury cup, so as to render it easy to close and open the circuit instantaneously.

To the ends of the poles, stout copper holders, which may be plated, are fitted or unfitted at pleasure; these are constructed with a slit, to receive the cauterizing wire, which is fixed during the operation, and held tight by a sliding ferrule or screw.

Method.—In operating on a fistula, open at each end, the platina wire is first passed through the fistulous passage; its ends are then fitted on to the holders and these on to the two poles. The soft parts around being held aside, and the wire carefully disposed, the circuit is closed at the mercury cup, for a period calculated beforehand, as necessary to complete the cauterization.

If the passage be a cul-de-sac, the wire may, if practicable, be carried through it on a nævus-needle, and then be used as just now described; or, being first fixed to the holders, it may be bent into a loop, (having its two sides kept apart,) which is then inserted into the sinus, and the electric current made to pass along it.

The length of wire between the poles should just correspond with that of the fistula or sinus to be cauterized; and the time necessary for the operation may be best determined by

allowing about twice the period taken by the same wire and battery to cauterize a track of the same length through a piece of dead muscular tissue.

When soft parts are to be quickly divided by the electric cautery, as in the case of fistula in ano, the wire should be at least twice as long as the thickness of the part to be cut through, so that it may be drawn, during the operation, to and fro with a sawing movement.

For the removal of soft parts, the wire (being fixed to the holders in the form of a loop, twice as long as the thickness of the part to be cut away,) is placed against the base of that part, and being heated, is used with or without a slight sawing movement.

If the part to be removed be large, it may be first transfixed by the wire, which being then properly fitted to the poles of the battery and heated, is made to divide one half of the mass, and then, without being unfitted, is carried to the bottom of the cut already made and drawn through the remaining half.

In proportion to the vascularity of the part to be divided or removed, the wire must be thicker, the heat less intense, and the sawing more gently performed, so that the section may be gradual and the cautery be allowed a longer time to penetrate and close the larger vessels.

Lastly, other modes of application, by varying the forms of the platina employed, will be suggested according to circumstances.

A CASE OF
STRANGULATED OBTURATOR
OR
THYROIDEAL HERNIA,
SUCCESSFULLY RELIEVED BY OPERATION.

BY

HENRY OBRÉ,

FORMERLY ASSISTANT-SURGEON TO THE ST. MARY-LE-BONE INFIRMARY.

COMMUNICATED BY

PROFESSOR ERICHSEN.

Received April 12th.—Read June 24th, 1851.

PROTRUSION of a portion of intestine through the opening which transmits the vessels in the Obturator Ligament, is a displacement of very rare occurrence. The authors of our own country, who have devoted their attention to the subject of Hernia, and collected a vast amount of scattered information, have been unable to find a single case of this accident, which had been detected during life; instances are not so rare of the patient suffering from all the usual symptoms of strangulated intestine, and after death, a portion of intestine having been found protruding below the obturator ligament. Continental writers have described the disease more frequently, recorded a number of cases, and have preserved the parts, showing death to have been caused by undetected strangulation through this opening. I have been equally unsuccessful in finding in their writings instances in which this hernia has been relieved by operation. Sir A.

Cooper gives the account of a case by M. Malaval, published in the Memoirs of the Royal Academy of Surgery of Paris, in which he attempted to reduce a hernia of this description, and succeeded in returning the intestine, but not the omentum. M. Arnaud made an incision down to the swelling, and found a piece of omentum protruding, which he cut away, as well as a portion of the sac, and the patient recovered. The simplicity of the operation as described, must throw some doubt on the correctness of the description, of omentum having passed through the obturator opening. We cannot reconcile so deep a part being exposed by a simple incision. When we reflect on the depth of the obturator foramen, and its protection by muscular structures, which both cover and surround the opening, we can readily conceive not only with what difficulty the intestine can be displaced in this direction, but also when it occurs, how numerous are the impediments to its presenting the usual form and character of a hernial protrusion in other parts. The faithful narration of the symptoms and appearances which presented themselves in a case of this description, which lately came under my observation, will best enable others to recognise this accident, and prepare them for the difficulties which must present themselves, in an operation for the release of a portion of strangulated intestine so deeply situated.

Mrs. W—, a tall person, moderately stout, æt. 55, the mother of a large family, applied to Mr. Gardener, of Lisson Grove, on the evening of Tuesday, February 18th, 1851. She was suffering from abdominal pain and nausea: aperient medicines were prescribed. On the following morning, Mr. Gardener, finding her symptoms not relieved, inquired if she were the subject of rupture, and was answered in the negative. At the next visit, on the 20th, his patient had not received the slightest relief; on the contrary, the abdominal pain had increased, and was accompanied by vomiting. Mr. Gardener, feeling confident that these symptoms were the

result of some mechanical obstruction, examined the regions in which hernia is usually found, and satisfied himself that there was no hernial tumour, but a *little below* the femoral region on the right side, he detected a degree of hardness resembling a small gland, of the size of a bean, and deeply seated. During the day, Mr. Robinson accompanied him, to make a more careful examination of the thigh, but was unable to discover more than a general fulness of its upper and anterior part, in addition to the deeply-seated hardness before mentioned. These gentlemen were inclined to think a portion of intestine had become strangulated. Early on Friday the 21st inst., I visited the patient with Mr. Gardener. She was in bed, suffering extreme abdominal pain in the umbilical region, and during the previous 12 hours, her vomiting had become stercoraceous and incessant. The countenance was pale and contracted, the voice faltering, the pulse weak, small, and intermitting at every third or fourth pulsation; in short, all the symptoms of impending dissolution from strangulated intestine were present. Whilst sitting by her side, and examining her under the bed-clothes, I was unable to detect any tumour or swelling, and was inclined to consider the impediment as existing within the abdominal cavity, when Mr. Gardener directed my attention to the previously described hardness. On uncovering the upper part of both thighs at the same time, the eye detected a *slight degree* of fulness in Scarpa's triangle on the right side; this triangle of the opposite limb was well marked with a hollow or depression passing down its centre, but this was lost on the affected side, and the whole contour of this part of the limb was visibly fuller than that of the corresponding; there was no tumour or circumscribed swelling, but on standing over the patient, and using firm pressure with the ends of the fingers over the neighbourhood of the femoral artery, and a little below the saphenous opening, a distinct hardness could be felt (slight in its extent), giving an impression as if the sheath of the vessels were being pressed on. The patient still persisted in her statement,

that she never had been the subject of rupture. On further inquiry, however, Mrs. W— stated that she had felt some slight inconvenience and pain in the right limb, for the previous fortnight, which she attributed to the enlargement of two little glands, about the junction of the upper and middle thirds of the thigh, accompanied with pain in the part, so as to oblige her to rest the extremity. The action of the bowels had been irregular during the same period.

Her dangerous state having been duly considered, it was thought prudent to make an incision down to the hard structure, in the hope that it might be caused by constriction of the intestine deeply situated in the femoral canal. The uncertainty of the result having been named to the sufferer and her husband, they consented to the operation as a probable means of saving her life. I made a straight incision into Scarpa's triangle, as in the customary operation for tying the femoral artery, beginning about three inches below Poupart's ligament; the dissection was continued in the direction of the enlarged and hardened structure, until the cribriform fascia was opened, and the saphenous opening exposed, when some little disappointment was felt in not finding a portion of intestine confined there. The extremity of the index finger could now distinctly feel the hardened structure, deeply situated at the inner border of this opening; the dissection was resumed and continued with difficulty in so deep a part, and some embarrassment was caused by the saphenic vein, which passed through part of the wound, as did also branches of the anterior crural nerve. The fascia lata was divided, and the pectineus muscle exposed at the inner side of the wound, which it was found necessary to elongate, as it was impossible to continue the dissection at such a depth, unless the original incision were extended. The external fibres of this flat muscle were cleared from the surrounding structure, and divided transversely for about an inch and a half or two inches. I had only to separate with my finger some cellular tissue, when a portion of intestine, covered with its sac, and firmly held down by the other mus-

cular structures that surrounded it, came into view. On being liberated, it suddenly ascended into the wound, being distended by flatus to the size of a pigeon's egg. Its true character was now discovered, and the finger with some difficulty, from the depth at which it was situated, passed along the protruding intestine to the obturator opening, through which it had escaped. The narrow circumference of the foramen and the surrounding bones were examined both by Mr. Gardener and myself. The symptoms of strangulation having existed three days, it was considered prudent to open the sac, which contained a portion of the small intestine, blue and congested; and though the opening through which it had passed did *not tightly* inclose its neck, it was deemed prudent to divide its edge slightly, as some difficulty would have been found in returning the intestine without using pressure to empty it of its flatus. The extreme depth of the wound, added to the upward turn which the index finger was obliged to take in being used as a director to a blunt-pointed bistoury for the division of the stricture, was found the most difficult part of the operation, as well as to avoid various important vessels and nerves that surrounded the knife. Unfortunately the saphenic vein not having been sufficiently held out of the way, was divided at the same time as the stricture; and from the extreme depth of the wound it was a matter of congratulation that no other serious mischief had taken place. The intestine having been returned as well as the sac, some little difficulty was found in securing the *upper* division of the vein, which was the only bleeding part. This being the only ligature requisite, the wound was closed by the necessary bandages, and the patient placed in bed. No medicines were administered. As the bowels had acted three times in the course of the day, after the operation, an opiate was prescribed at bedtime.

22d. Has passed a good night. No abdominal pain; pulse intermitting; a rough sound to be heard accompanying the second sound of the heart.

23d. The patient is going on favorably.

March 1st. The ligature came away to day. From this time she made a rapid improvement; the pulse lost its intermission; the sounds of the heart became regular and natural; and when she was examined a month after the operation, no hernial protrusion was to be felt, and she had no inconvenience whatever in walking.

SOME

OBSERVATIONS ON THE PATHOLOGY

OF THOSE

AFFECTIONS OF THE EAR

WHICH PRODUCE

DISEASE IN THE BRAIN.

BY

JOSEPH TOYNBEE, F.R.S.

FELLOW OF THE ROYAL COLLEGE OF SURGEONS IN ENGLAND,
AURAL SURGEON TO ST. MARY'S HOSPITAL, AND
CONSULTING SURGEON TO THE ST. GEORGE'S AND ST. JAMES'S
GENERAL DISPENSARY.

Received April 22d.—Read June 24th, 1851.

It was my intention to lay before the Medical and Chirurgical Society some extended researches into the Pathology and Treatment of the Affections of the Ear, which give rise to Disease in the Brain. The reason that has induced me to abandon this intention, and to limit myself to some observations in pathology, is the great extent to which the inquiry has conducted me, and the consequent impossibility to do justice to so important a subject in the limits of a Paper. Being anxious, nevertheless, to submit to the Fellows of this Society some of the results at which I have arrived, in order that those results may be duly considered, I have brought before them certain leading points, which, I trust, will not be deemed unworthy of their attention.

The great frequency of cases in which disease advances from the Ear to the Brain is, unfortunately, too well known to the medical profession, by the almost constant occurrence of fatal instances in which disorganisation of the brain, and its membranes have supervened upon long-standing affections

of the ear. In our own country this subject has occupied the especial attention of some of its most celebrated members, among whom may be named Abercombie, Bright, Watson, and Burne, while, on the continent, it has been investigated by Morgagni, Itard and Lallemand. The results of the researches of these writers, among whom the name of Lallemand may be especially referred to, are of considerable interest; but the want felt by every inquirer into this branch of surgery, is a proper classification of those cases which have thus far been included under the comprehensive term, "caries of the petrous bone ending in disease of the brain." It has been my object to supply this want; and, in the following brief communication, I shall attempt—1st, to point out the nature of the several affections of the ear which produce disease in the brain; and 2d, to show that each of the cavities of the ear has its particular division of the encephalon to which it communicates disease, thus:

1. Affections of the external meatus and mastoid cells produce disease in the lateral sinus and cerebellum.

2. Affections of the tympanic cavity produce disease in the cerebrum.

3. Affections of the vestibule and cochlea produce disease in the medulla oblongata.

In the consideration of this subject I shall examine, seriatim:—

1. The affections of the external meatus.
2. Those of the mastoid cells.
3. Those of the tympanic cavity.
4. Those of the vestibule and cochlea.

1. AFFECTIONS OF THE EXTERNAL MEATUS.

Anatomical Observations.

The osseous external meatus is lined by epidermis, the dermis, and the periosteum. In a paper lately published by the Royal Society,[1] I have shewn that these three structures are continuous with the *membrana tympani*,

[1] 'Philosophical Transactions,' Part I, 1851, page 159.

of which, indeed, they form the three outermost laminæ. The knowledge of the fact, that the dermis of the external meatus is continuous with, and forms one of the layers of the membrana tympani, is of considerable importance to the surgeon; for it will be seen that disease originating in this lamina is frequently prolonged to the meatus; whence it is liable to progress to the bone and the brain.[1] The dermoid layer of the membrana tympani is well supplied by blood-vessels and nerves, and it adheres by fine cellular tissue to the outer surface of the radiate fibrous lamina. In the meatus, the dermis and periosteum are so intimately connected, that it is almost impossible to separate them, and the blood-vessels which ramify through them have a communication with those in the substance of the osseous meatus. The intimate connection between the dermis of the external meatus and the substance of the bone is therefore very obvious.

The relations of the osseous walls of the external meatus to the cavity of the cranium are of much interest. In the adult, it will be found that the *upper wall* of the meatus consists of a solid lamina of bone, varying from a line to two lines in thickness, which separates the cavity of the meatus from that occupied by the middle lobe of the cerebrum. In some instances, a prolongation of the tympanic cavity is found to extend into the substance of this upper wall of the meatus. The *posterior wall* of the meatus has intimate relations with the sulcus lateralis and the fossa cerebelli, especially at the period of youth, and previous to the age of twenty-five or thirty.[2] At these periods of life it will be

[1] The circumstance that inflammation, originating in the external meatus from cold or the use of an ear-pick or pin, often rapidly extends to the membrana tympani, causing its partial or complete destruction, may be accounted for by the free communication that exists between the blood-vessels of the dermis and those of the dermoid layer of the membrana tympani.

[2] In later periods of life, the mastoid cells are developed to so great an extent, as to separate the posterior wall of the meatus from the sulcus lateralis; and disease then occurring in the meatus, unless it is very extensive, is generally confined to the mastoid cells, and does not involve the cavity of the cerebellum.

found that the layer of bone forming the *outer* third of the posterior wall of the meatus, and which separates the cavity of the meatus from that of the sulcus of the lateral sinus, is frequently not more than half a line in thickness; indeed, it is often so thin as to be translucent; this layer of bone is penetrated by numerous orifices for blood-vessels, which extend into its substance, and they communicate with those derived from the dura mater. In instances where the posterior wall of the meatus is thicker than stated above, the blood-vessels ramifying through its substance, and which arise from the membranous meatus, seem, nevertheless, to have a communication with those which enter the bone at its inner surface. The *inner* two thirds of the external meatus has intimate relations with the sulcus lateralis through the medium of the mastoid cells, a very narrow portion of which cells is all that exists between them; not unfrequently, this portion of the osseous wall of the meatus is so thin, as to be translucent, and sometimes portions of it are absent, and a direct communication exists between the meatus and the mastoid cells.

From the above anatomical observations, it will, I think, be apparent, that disease originating in the external meatus during the first half of the period of life, is liable to extend to the fossa cerebelli, and especially to that portion of it which contains the lateral sinus. The result of careful observation has been to show, that as a general rule,[1] whenever disease in the cerebellar cavity supervenes upon an affection of the ear, the external meatus has been the portion of the ear affected.

I shall now proceed to point out the nature of the disease in the meatus which is found most commonly to extend to the bone, and thence to the cavity of the cerebellum. Previous to doing so, however, I may perhaps be allowed the opportunity of stating, that in this paper, and indeed in all my researches into diseases of the ear, I have thought it

[1] To this general rule there are two exceptions, which will be noticed.

desirable to abolish the use of the term *otorrhœa;* when it is known that discharge from the external meatus may arise from as many as seven different sources, it must appear evident to every scientific medical practitioner, that the disease causing the discharge should be specified, instead of using a word which can only be considered as a mask under which is concealed our ignorance of the real nature of the affection.

One of the most common affections of the external meatus is, *chronic catarrhal inflammation of its dermoid layer;* this name I have given to the affection in which the surface of the dermis becomes red, and instead of secreting the epidermis in a continuous layer, the cells composing this structure are thrown off in an early stage of their development and form a mucous discharge. This affection, innocent as it appears, without proceeding to ulceration, is the most frequent cause of disease to the bone and cerebellum. It often persists during many years, all which time the discharge never ceases, or only for short intervals; the surface of the dermis often loses its unnatural redness, but its substance becomes tumefied, and often to so great an extent, as nearly to close the cavity of the meatus. Coexistent with this condition of the dermis, the periosteum becomes soft and detached from the bone, the blood-vessels having become much enlarged, the bone inflames, and caries or necrosis follows; the dura mater is detached from its inner surface, the lateral sinus inflames, purulent matter is deposited on its external as well as on its internal surface, and death occurs as the result of purulent infection. In cases where the lateral sinus is not so deeply involved, the cerebellum in the vicinity of the diseased bone is found to be much softened, in a state of purulent degeneration, or an abscess occupies one of its hemispheres.[1] During the progress

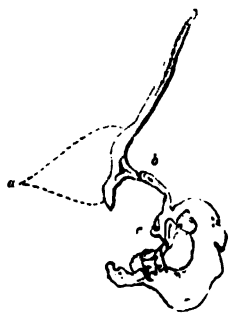
[1] Dr. Watson, in his published Lectures, 3d edition, vol. i, p. 370, makes some very interesting observations on those cases of disease in the ear which terminate in purulent infection. In the subjoined Table I have made a careful analysis of these and of all other fully-recorded cases I have been able to meet with, in which disease has been prolonged from the ear to the brain and has produced death.

of the morbid changes which have been enumerated, there are frequently no symptoms calculated to indicate to the medical man the presence of so formidable a disease, and which may terminate in the death of the patient after an acute attack of a few days' duration.

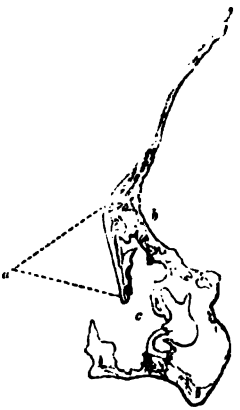
The patient suffers little, or perhaps no pain in the ear or head; the surface of the meatus presents no appearance of ulceration, even although extensive caries of the bone may be present; the only prominent symptom is the presence of discharge, which, as a general rule, does not disappear, or only during short periods. An examination of the accompanying table is sufficient to show, that the chronic disease of the ear may endure so long as twenty years, or even during the whole of a long life, without the occurrence of any formidable symptoms; and cases of this nature have induced the profession to look upon the symptom of long-persistent discharge, as one of but trifling importance; but the result of my own observations is to show, that as a general rule, if the progress of this affection be unchecked, the bone and cavity of the cranium become slowly diseased, and death is liable to ensue upon the occurrence of any trifling exciting cause, as an attack of influenza, cold, or a blow on the head. In the foregoing observations I have alluded to only one form of disease in the external meatus which is productive of fatal mischief to the cerebellum, viz., *chronic catarrhal inflammation of the dermoid layer;* in the majority of cases which I have examined, death has taken place without the occurrence of *ulceration* in this membrane; but in those instances where a large portion of bone is necrosed, the membranous meatus ulcerates, and through the aperture the necrosed bone is distinctly felt.

I shall now proceed to notice those exceptional cases, to which allusion has already been made, where disease is propagated from the external meatus to the *cerebral* cavity, and where the cavity of the cerebellum is not affected. Previous to doing so, it will be requisite for me to make some observations on the structure and relations of the osseous external meatus during the early periods of life.

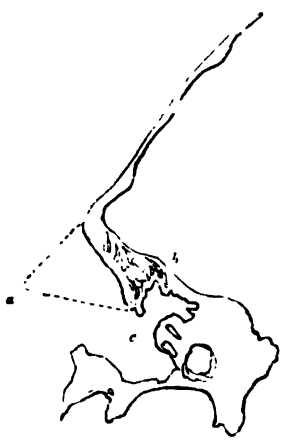
1



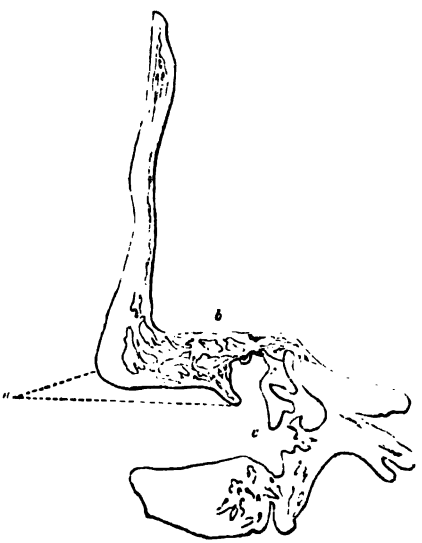
2



3



4



At the time of birth, and for the first year subsequent to it, the only rudiment of the osseous external meatus, is the superficial depression, situated in the middle of the outer and lower part of the *pars squamosa*, immediately posterior to the root of the zygomatic process. This depression, to which the name *fossa auditoria* may, with propriety, be applied, has the rudiments of the mastoid process posterior to it; the surface of this "fossa auditoria" is more smooth and its substance is more dense, and it contains fewer foramina than the surrounding bone. At the period of birth, the portion of bone forming this fossa is not more than half a line or three quarters of a line thick, and the membranous meatus is attached to its outer, and the dura mater to its inner surface. Its structure is far from being compact and dense; and in its substance the blood-vessels from the meatus communicate with those of the dura mater. The relations of the *fossa auditoria* at the period of birth, and during the first year of life, are shown in the figure, which represents a vertical section of the temporal bone from without inwards in a line through the fenestra ovalis, (fig. 1.)[1] Subsequently to the first year of life, and during the period of youth, the substance of the bone situated between the fossa auditoria and the middle cerebral fossa, so increases in thickness, that the outer and inner surfaces of the cranium are separated by a space varying from a line to a line and a half thick, (fig. 2.) As the bone approaches maturity, the fossa auditoria assumes an oblique position, and forms the upper wall of the external auditory meatus, and it is separated from the cavity of the middle cerebral fossa by a dense layer of bone, into which the tympanic cavity is not unfrequently prolonged, (fig. 3.) In the adult, the fossa auditoria has lost its oblique direction, and forms a horizontal lamina of bone. This position of the fossa auditoria is seen in fig. 4.

A consideration of the above description of the relations of the fossa auditoria will render it evident, that at an early

[1] In this as well as in the two following figures, *a* indicates the fossa auditoria; *b* the inner surface of the fossa auditoria forming part of the outer wall of the middle cerebral fossa; *c* the cavity of the tympanum.

period of life, viz., during the first year, there exists between the membranous meatus and the dura mater of the middle cerebral cavity, only a very delicate layer of bone, through which disease is liable to extend from the meatus to the brain. As the bone is developed, the external meatus is separated from the cerebral cavity by a more considerable space, and the meatus is brought into intimate relations with the lateral sinus; it will, accordingly, be found, that disease which is prolonged from the external meatus to the *cerebral* cavity, originates and affects the bone *within the first year of life*. As a general rule, this disease, if unchecked, destroys life within a few months of its origin; but cases are met with, and of which I have recorded two in the subjoined Table, where death did not occur in childhood, but where nature made vigorous efforts to repair the injury to the bone; but in which the disease had so injured the cerebrum and its membranes, that, although one patient lived eleven, and the other between fifty and sixty years, death ultimately occurred in each from the effects produced during the first year of life. It may at first appear difficult to distinguish between these cases and those of disease occurring in the upper wall of the tympanum, which produce death by exactly the same changes in the brain and its membranes. The distinguishing difference will, however, be found in the fact, that where the disease has originated during early life in the external meatus, the portion of bone which then formed the fossa auditoria, (and which in later life becomes the upper wall of the *meatus*,) is the seat of the disease. Where the disease begins in early life, certain results of the process of reparation are apparent in the form of new bone, which is deposited, not only on the inner, but on the outer surface of the squamous bone and auditory meatus, which results are not met with, in ordinary cases of caries, in the upper wall of the tympanum.

A *second* exception to the rule above laid down, that disease in the cerebellum and lateral sinus originates in affections of the meatus externus, is found in those cases where disease extends backwards from the tympanic cavity,

involves the mastoid cells, and produces caries of their inner wall. These cases appear to be rare; and, as a general rule, the mastoid cells become affected as the result of disease originating in the external meatus.

The pathological conditions produced by the diseases of the external meatus may be summed up as follows:—

1. Coagula in lateral sinus.
2. Pus in lateral sinus.
3. Pus in lateral sinus, and secondary deposits.
4. Pus on the surface of the cerebellum.
5. Abscess in the substance of the cerebellum.

2. AFFECTIONS OF THE MASTOID CELLS.

It will be sufficient for me to indicate here, that in the adult, the posterior surface of the mastoid cells is covered by the dura mater of the cerebellar cavity, and that the lateral sinus is lodged in a sulcus of this wall, in order to render it evident that disease is liable to be propagated from the mastoid cells to the lateral sinus and cerebellum. The source of the diseases of the mastoid cells is generally the external meatus, and they have, therefore, been alluded to in the preceding section; but cases of disease originating in the mastoid cells, and which proceed to the destruction of its posterior wall, the lateral sinus and cerebellum, are sometimes met with, and of one of these I give the particulars.

T. D—, æt. 29, four months previously to his death, complained of great pain in the situation of the right mastoid process; this pain was attended by earache, drowsiness, giddiness, and a discharge from the meatus. Upon examination, the membrana tympani was observed to be entire, but its surface was dull, and it had a milky colour. The surface of the meatus was tumefied, and the discharge originated from it. In spite of all treatment, the head symptoms greatly increased, and stupor supervened. An abscess which formed behind the ear was opened, and a large quantity of purulent matter was discharged without affording any relief.

Post-mortem Inspection.—The external meatus contained a considerable quantity of muco-serous discharge; the surface of its dermoid layer was denuded of epidermis; its substance was much tumefied. The membrana tympani was entire, but of a dull leaden hue, and much softer than natural. The cavity of the tympanum contained a considerable quantity of purulent matter, and its lining membrane was vascular, thick, and flocculent. The incus had disappeared, the stapes retained its position, but was surrounded by bands of adhesion. The bony walls of the tympanum were healthy. The mastoid cells were full of purulent matter; upon its removal, the bony laminæ dividing the cells were found to be extensively carious, large portions of them having been removed. The whole of the inner wall of the mastoid cells, usually formed by the floor of the lateral sinus, was completely destroyed, and in the macerated bone the mastoid cells communicated with the cavity of the cranium by an elongated orifice, measuring one inch and a quarter from above downwards, and more than half an inch from before backwards. A circular orifice about the size of a pea existed at the posterior and upper part of the mastoid process, which allowed of the passage of pus into the abscess behind the ear, which was opened during life, and through which, there is no doubt, the incus had been discharged. I had not an opportunity of examining the state of the cerebellum; the membranous lateral sinus was much attenuated. It is interesting to observe that, although the disease in this case was very extensive, it was almost wholly confined to the mastoid cells, in which, no doubt, it had originated. The condition of the mucous membrane of the tympanic cavity, and of the dermoid layer of the external meatus, may be looked upon as the result of sympathetic action.

3. AFFECTIONS OF THE TYMPANIC CAVITY.

Cases of disease originating in the tympanic cavity and extending through its upper wall to the dura mater and cerebrum, are of more frequent occurrence than those which

formed the subject of the last section. The frequency of cases of disease of the cerebrum and its membranes which originate in the tympanic cavity, may be accounted for, *firstly*, by the great liability of the mucous membrane of the tympanum to undergo pathological changes; and *secondly*, by the existence of very intimate relations between this membrane and the dura mater.

Anatomical Observations.

The intimate relations between the mucous membrane of the tympanum and the dura mater, to which allusion has just been made, occurs at the upper wall of the tympanum, which will be found to consist of a lamina of bone extending from the angle of union between the squamous and petrous bones to the vestibule and semicircular canals, and from the mastoid cells posteriorly to the eustachian tube anteriorly. This lamina is about an inch in length, and at its middle part, which is widest, about a third or half an inch in breadth. The structure of the upper wall of the tympanum varies very much in different persons. It may be described as being generally from a quarter to half a line thick, but it is very often so thin as to be translucent; and it is far from being an uncommon occurrence, that this lamina is deficient in parts so as to admit of the mucous membrane of the tympanum being in contact with the dura mater. It will readily be conceived, that disease attacking the mucous membrane of the tympanum is liable to implicate the upper osseous wall, and dissection shows that this wall is the one usually affected whenever the bone has become diseased.

The affections of the mucous membrane of the tympanum which usually give rise to disease in the brain, are acute inflammation, chronic catarrhal inflammation, and ulceration, but of these the one most frequently occurring is chronic inflammation. Chronic catarrhal inflammation of the mucous membrane of the tympanum, one of the affections which has been comprised under the term *otorrhœa*, most frequently originates at the period of childhood, and an attack of cold, scarlet fever, scarlatina, measles, or low fever, is generally the

exciting cause. The predisposing cause may almost always be traced to a tendency to glandular enlargement; and although this affection of the mucous membrane of the tympanum occurs sometimes where the tendency above alluded to does not exist, still I think it will be found that in these cases, it does not remain longer than a few weeks, and that it never terminates in disease of the bone. This affection, at its origin, consists in a hypertrophy of the mucous membrane lining the tympanum; this thickening is accompanied by an increased secretion of mucus with which the tympanic cavity becomes completely distended. The inner surface of the membrana tympani is thus pressed upon, and it becomes slowly atrophied, and a portion of it is removed by absorption; an orifice in the membrana tympani is thus produced through which the mucus, secreted in the tympanum, is discharged into the meatus externus. Upon removing the discharge from the meatus and tympanum, the tympanic mucous membrane can be distinctly observed through the aperture in the membrana tympani; it is generally found to be so thick as to fill up a considerable portion of the tympanic cavity, of a bright red colour, and its surface shining. The discharge differs from that secreted in chronic catarrhal inflammation of the dermoid meatus in consisting of portions of viscid mucus, which float in water without mingling with it; sometimes these portions are so small as to appear like pieces of fine string or thread. Chronic catarrhal inflammation of the mucous membrane of the tympanum may continue during many years without the occurrence of any ulcerative process, but its presence is very commonly the cause of disease in the petrous bone and in the cerebrum. In some cases the irritation of the mucous membrane of the tympanum appears to be sufficient to originate disease in the cerebrum, and an abscess is developed in its substance, without the occurrence of any morbid condition in the bone or dura mater. The usual result of a prolonged continuance of this affection is, that the mucous membrane lining the upper wall of the tympanum becomes detached from the bone, while the dura mater, at the same

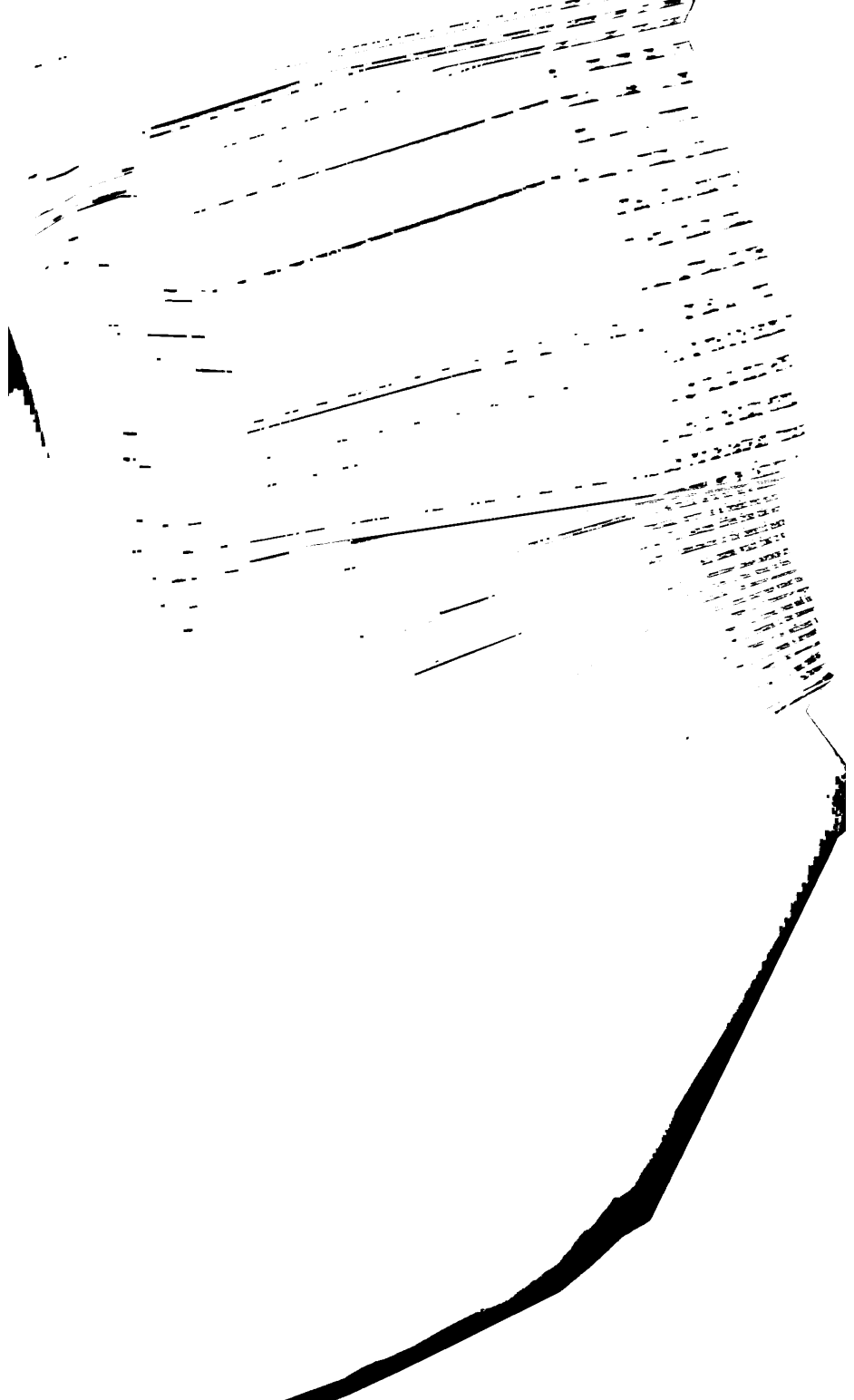
time, loses its adhesion to its upper surface; the substance of the bone having thus lost its supply of nutrient fluid, becomes carious, purulent matter is secreted around it, and the two investing membranes ulcerate, the disease spreading from the dura mater to the substance of the brain. The pathological changes produced in the brain and its membranes by the affection of the ear, now under consideration, may be thus enumerated:

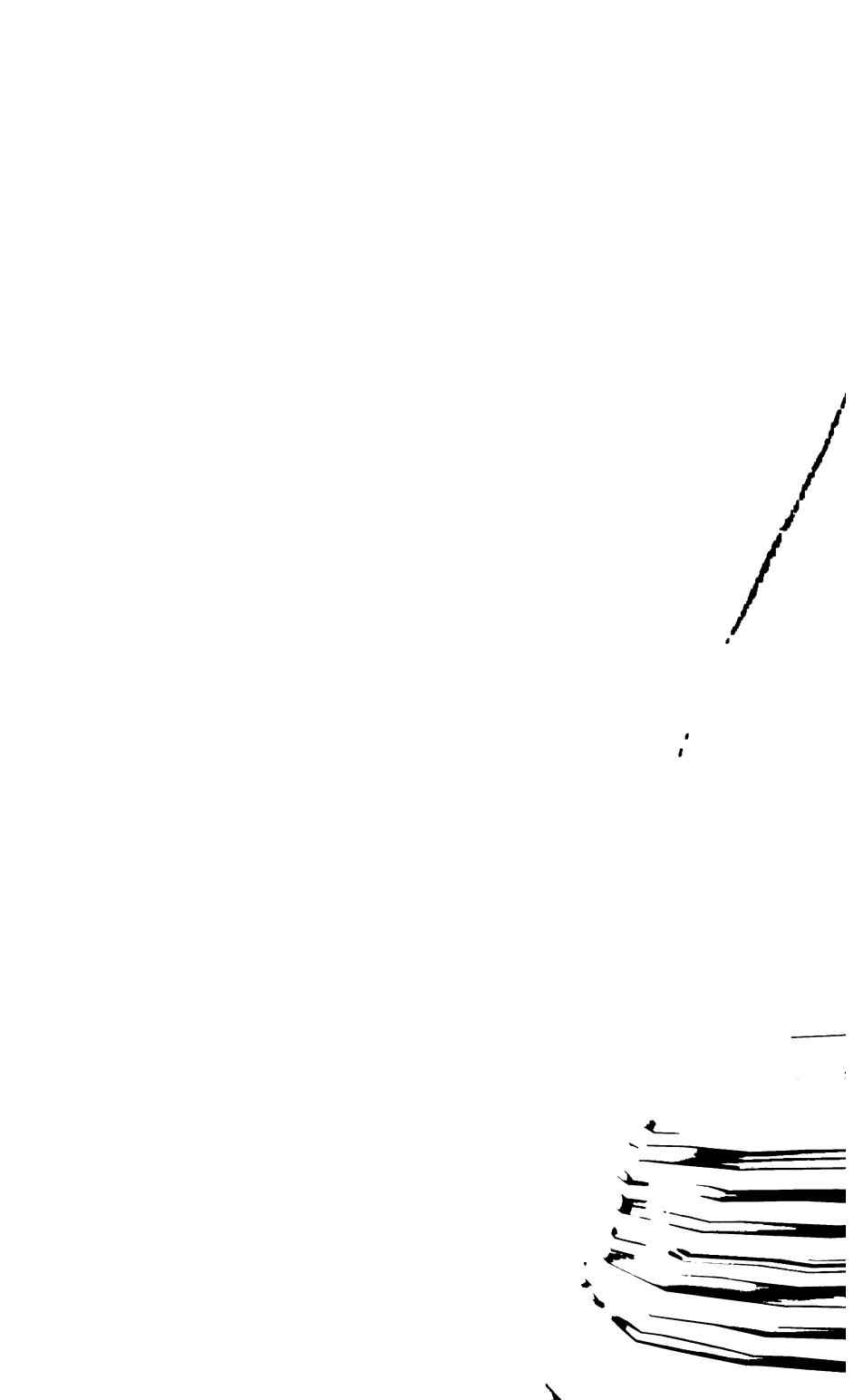
1. Inflammation of the dura mater, and its separation from the surface of the petrous bone by serum.
2. Ulceration of the dura mater, and its complete detachment from the petrous bone.
3. An abscess in the substance of the cerebrum.
4. Undefined suppuration of the substance of the cerebrum.

From an examination of cases, it appears that chronic catarrhal inflammation of the mucous membrane of the tympanic cavity, may exist as many as twenty or more years without the production of any disease beyond it, or, at least without the existence of any symptoms by which the presence of such disease can be diagnosed; nevertheless, in the great majority of cases, vital structures become sensibly affected in a much shorter period. It is not in my power to enter here into the details of cases belonging to this class; but those desirous of obtaining further information will refer to the accompanying Tables, which contain the leading facts of importance pertaining to many well-authenticated cases.

4. THE LABYRINTH.

Cases in which disease is propagated from the cavities of the vestibule and cochlea to that of the cranium, are of much more unfrequent occurrence, than those which have been previously referred to. To those who are aware how directly the auditory nerve establishes a communication between the two cavities above named and the medulla oblongata, it may be well conceived, that disease occurring in them, is liable to be prolonged to the medulla, and to the membranes investing it. This communication may take place without the presence of any disease of the bone, the small orifices at





the floor of the internal auditory meatus, through which the fine filaments of the nerve take their course, being quite sufficient to allow of the transmission of the disease from within outwards. The affection which is the source of the disease in the medulla oblongata, so far as my experience has gone, appears to originate in ulceration of the mucous membrane of the tympanum; this affection having proceeded to the destruction of the fibrous investment of the tympanum, the stapes is detached from the circumference of the fenestra ovalis, and is discharged from the external meatus, or the membrane covering the fenestra rotunda is destroyed. Sometimes both of these changes take place; sometimes only one: under either circumstance, the lining membrane of the labyrinth partakes of the diseased action which originated in the tympanum, the labyrinth becomes filled with purulent matter, the expansion of the auditory nerve is destroyed by ulceration, and its trunk becomes inflamed; the inflammation extends through its substance as far as the medulla oblongata, the membranes of which are implicated in the disease, and death ensues from an effusion of pus or serum.

I shall not lengthen this paper by entering into a more minute consideration of this branch of the subject, but will refer to the following analysis of three cases of—

Disease in the Cerebral Cavity, extending from the Labyrinth.

Age.	Duration of chronic symptoms.	Acute symptoms causing death—their duration.	Post-mortem appearances.	By whom the case was reported.
22	Not stated.	Toothache; fever; cerebral irritation. Five weeks.	Auditory nerve in a state of suppuration; pus in labyrinth; pus on the surface of cerebrum and cerebellum.	Itard, 'Traité des Maladies d'Oreille,' tom. i, p. 254.
42	Thirty-five years.	Pain in head; coma. Five days.	Pus in tympanum and labyrinth, and around the medulla oblongata.	Mr. Streeter, Med. Gazette, 1834, p. 553.
17	For twelve years, discharge from left ear.	Pain in head and ear. Twenty-two days.	Pus in tympanum and labyrinth; auditory nerve of a dark colour; purulent matter deposited on the surface of the medulla oblongata, crura cerebri, and pons varolii.	Mr. Avery, MS. notes and preparation, to Author.

Conclusion.

The preceding observations, together with the report of cases, as detailed in the Tables, appear to show that chronic catarrhal inflammation affecting the dermoid layer of the membrana tympani, the dermoid meatus, or the mucous membrane lining the cavity of the tympanum, if allowed to proceed unchecked or uninfluenced by the aid of remedial measures, is liable to produce results fatal to life. These fatal results may occur within the first few months of the existence of the disease, or they may be deferred so long as ten, twenty, or even fifty years; in some cases patients die at an advanced period of life from disease quite independent of that in the ear. The result of my investigations, nevertheless, tends to show, that the affections above named cannot exist during many years, without causing a greater or less amount of disease in the bone, dura mater, or brain; and it is evident from the inspection of cases, in which some disease irrespective of the ear has caused death, that a very trifling exciting cause would have been sufficient to give origin to fatal disease in the brain. It is important, therefore, to bear in mind, that the bone, dura mater, and substance of the brain, may be slowly undergoing disorganisation without the presence of any other symptoms, calculated to reveal to the medical man the existence of formidable disease, than the presence of a discharge from the external auditory meatus. From the facts cited above and in the following Tables, I think it may be laid down as a rule, that *no person suffering from chronic catarrhal inflammation of the dermoid layer of the meatus, the membrana tympani, or of the mucous membrane of the tympanum,*[1] *can be assured that disease is not being prolonged to the temporal bone, the brain, and its membranes; and that any ordinary exciting cause, as an attack of fever or influenza, a blow on the head, &c., may not induce the appearance of acute symptoms, which, as a general rule, are speedily fatal.*

[1] In these three affections are included the great majority of cases hitherto styled—*otorrhœa.*

TABLE I.—*Cases of disease of the Dura Mater and Brain, originating in affections of the Tympanic cavity.*

	Age.	Duration of discharge.	Acute symptoms and their duration.	Post-mortem appearances.	By whom reported.
1—Dura mater inflamed and detached from the bone.	21	No discharge . .	None complained of . .	Dura mater covering the petrous bone vascular, and separated from the bone by a small quantity of serum.	Author, MS. notes.
	17	No discharge previous to fever.	Typhus fever, great dullness of hearing, discharge from left ear four or five days. Nine days.	Upper wall of tympanum vascular, the dura mater separated from it by a small quantity of serum.	Author, MS. notes.
	16	No disease previous to fever.	Typhus fever seven weeks, dullness of hearing.	Dura mater scarcely adherent to the upper wall of tympanum.	Author, MS. notes.
	60	Many years from both ears.	None complained of . .	Dura mater covering upper wall of tympanum, soft and thin; petrous bone carious.	Author, MS. notes.
2—Dura mater thick and detached from the bone.	Adult.	Subject to discharge from the left ear.	Fever, cerebral excitement.	Dura mater covering the upper wall of tympanum thick, and but slightly adherent to bone; bone carious.	M. Lallemand, 'Recherches Anatom. Patholog. sur l'Encephale.,' tom.ii, p. 121.
	11 months.	From the right ear from birth.	Great tenderness, swelling and sloughing around the ear; cerebral irritation, great debility. Four months.	The dura mater lining the inner surface of the squamous bone near to its junction with the petrous bone, was very thick, and separated from it by pus; a large portion of squamous bone destroyed by necrosis.	Mr. Wiling and Author, MS. notes.*
	26	Not stated . . .	Violent pain in the ear and cerebral excitement, delirium, stupor. Seven days.	Dura mater detached from the upper wall of the tympanum, and separated from it by a gelatinous fluid.	Itard, 'Traité des Maladies d'Oreille,' tom. i, p. 193.
	3	A year and a half from left ear, acute pain at times.	Pain in the ear and head, stupor. Few days.	Dura mater disconnected from the upper wall of tympanum, and adherent to the arachnoid; tympanic mucous membrane, very thick, soft, and red.	Author, MS. notes.
	10 months.	Five months from left ear.	Pain in the ear, abscess above and behind it, extreme debility. Six weeks.	Caries of squamous bone above meatus externus; dura mater thick and soft, separated from the bone by serum.	Author, MS. notes.*

* These are exceptional cases, where disease is propagated from the meatus to the *cerebral* cavity.

3.—Dura mater ulcerated and detached from the bone.	9	For a long period from left ear.	Fever, cerebral irritation, coma. Ten days.	Dura mater sloughy and separated from petrous bone by lymph; mucous membrane of tympanum thick.	Dr. Hutton, 'Lancet,' Dec. 26, 1846.
	65	For many years earache and dullness of hearing.	Not known	Dura mater thick, ulcerated, and detached from upper wall of tympanum, which is carious; mucous membrane of tympanum thick.	Author, MS. notes.
	30	Prolonged, dull of hearing.	Not known	Dura mater ulcerated; mucous membrane of tympanum thick.	Author, MS. notes.
	44	Twenty-four years from right ear.	Paralysis of the muscles of the right side of face a few days before death.	Dura mater covering the upper wall of tympanum, thick, and ulcerated; bone carious; mucous membrane of tympanum ulcerated.	Dr. Kingston and Author, MS. notes.
	16	Most probably for a long period from left ear.	Hæmorrhage, profuse discharge, coma. Twenty-six days.	Dura mater covering the upper wall of tympanum, ulcerated; bone carious.	Mr. N. Ward, 'Proceedings of the Pathological Society of London,' 1846-7, p. 11.
4.—Undefined suppuration of the cerebrum.	20	Not reported . . .	Headache, cerebral irritation. Three weeks.	Lower part of middle cerebral lobe in a state of suppuration, above it an abscess; petrous bone carious; dura mater discoloured and separated from the bone in parts by coagula.	Dr. Bright, 'Medical Reports,' vol. i, p. 149.
	18	A considerable period.	Headache, vomiting, stupor, partial coma. Eight days.	The right cerebral hemisphere was reduced to a mass of fetid pus.	Dr. Abercrombie, 'On Diseases of the Brain,' 3d ed., p. 92.
	18	Many years . . .	Rigors, headache, slight coma, great depression.	The whole of the left cerebral hemisphere was a mass of undefined suppuration; petrous bone carious; dura mater spongy.	Dr. Abercrombie, loc. cit., p. 93.
	18	Several years from right ear.	Fever, great cerebral irritation. Nine days.	The right cerebral hemisphere was in a state of suppuration; upper wall of tympanum wholly destroyed; dura mater gangrenous.	Mr. Obré and Author. MS. notes.
	4	Three years from the left ear.	Pain in the forehead and eyes, convulsions, insensibility, hemiplegia.	The greater portion of the left cerebral hemisphere in a state of suppuration; dura mater covering the upper surface of petrous bone, vascular; upper wall of tympanum of a dark colour.	Author, MS. notes.

5.—Abscess in the Cerebrum.

Age.	Duration of discharge.	Acute symptoms and their duration.	Post-mortem appearances.	By whom reported.
21	Discharge from right ear, with occasional intermissions, for fourteen years.	Violent pain in the ear and head, pain in the back and body, curvature of the neck backwards, delirium. Five weeks.	A large abscess in right middle cerebral lobe, tympanic cavity full of pus.	Dr. Duncan, 'Edinburgh Medical and Surgical Journal,' vol. xvii, p. 332.
Aged.	Since youth.	Intense headache, stupor. A short time previous to death.	An abscess in the corresponding cerebral lobe, upper wall of tympanum carious.	Dr. Duncan, loc. cit., p. 335.
23	Not recorded.	Pain in right ear, and headache; great cerebral irritation. Fourteen days.	An abscess in the inferior part of right middle cerebral lobe; upper surface of petrous bone dark; pus in tympanic cavity.	Dr. Williams, 'Anatomy, Physiology, and Pathology of the Ear,' pp. 169, 170.
28	From left ear for some years.	Intense pain in the head, following a blow, delirium, coma. Three weeks.	An abscess in the left anterior and middle cerebral lobes; dura mater partially separated from the upper wall of tympanum, which presented a small carious orifice.	Mr. Cæsar Hawkins, 'Medical Gazette,' vol. xvii, page 156.
Girl.	Subject to discharge from the left ear.	Cerebral irritation, convulsions. Thirty days.	An abscess in the centre of left cerebral hemisphere.	M. Pichot. 'Lancet,' vol. x, p. 460.
23	Fourteen years from the left ear.	Pain in the top of the head, followed by cerebral irritation. Ten months.	An abscess in the left middle lobe of cerebrum; dura mater detached from petrous bone; the latter soft and carious.	M. Lallemand, 'Recherches Anatomico-Pathologiques, sur. l'Encephale, 1823,' tome ii, p. 91.
Not stated.	A piece of paper in meatus externus for some months.	Violent pain in head, fever. Eighteen days.	An abscess in the lower part of middle cerebral lobe communicating with the tympanum.	M. Sabatier, 'Médecine Operatoire,' tome iii, p. 10.
Adult.	At intervals for some time from left ear.	Apoplexy, paralysis, convulsions. Ten days.	An abscess in cerebrum, above the left petrous bone; the latter carious.	Laubins, Lallemand, loc. cit., p. 118.

5.—Abscess in the cerebrum (*continued*).	26	From right ear since measles in childhood.	For twelve or sixteen months headache and giddiness; pain in the ear, heaviness, insensibility, twenty-three days.	An abscess in upper part of right cerebral hemisphere; dura mater detached from upper wall of tympanum, ulcerated and very thick.	Dr. W. Merriman and Author, MS. notes and preparation.
	10	Five years from left ear; earache at times.	Headache, vomiting, chilliness, five days; was then convalescent; a day after, intense pain in the ear came on. Ended in death in five days.	An abscess as large as a small hen's egg in the left middle cerebral lobe; dura mater over tympanic cavity very thick, partly detached, an orifice in one part; carious orifice in upper wall of tympanum; tympanic cavity full of scrofulous matter.	Mr. Farish and Author, MS. notes and preparation.
	Boy.	From left ear since childhood.	Convulsions, coma. Five days.	An abscess in the greater part of left middle lobe of cerebrum; dura mater ulcerated; upper wall of tympanum carious.	Mr. Pollock, 'Proceedings of the Pathological Society of London,' 1846-7, p. 13.
	Adult.	From right ear for twenty years.	Pain in the head fourteen days; fever, coma, four days.	An abscess in the right middle cerebral lobe; dura mater ulcerated; upper wall of tympanum carious.	Mr. Jarvis Highmore, MS. notes and preparation to Author.
	24	From left ear for three years.	Cerebral irritation, abscess, under the temporal muscle, delirium, coma. Some days?	An abscess in the left middle cerebral lobe; the dura mater partially detached from the petrous bone, thick, and of a dark brown colour; the bone dark, but not carious.	Mr. Pilcher, MS. notes and preparation lent to Author.
	55	Not stated . . .	Pain in the head, coma. Several days.	An abscess in the left middle and anterior lobes of the cerebrum, the inner surface of squamous bone presented a necrosed portion of bone surrounded by new bone; dura mater detached; new bone deposited on the outer surface of squamous bone; osseous meatus rough; there is an orifice in the squamous bone above the mastoid process, by means of which purulent matter escaped from the inner surface of the skull beneath the dura mater.	Mr. Pilcher, MS. notes and preparation lent to Author.
	12	Not known . . .	Cerebral irritation, fever, coma. Twenty-two days.	An abscess in cerebrum; pus between the dura mater and squamous bone; dura mater thick.	Mr. French, MS. notes and preparation to Author.*

* Case of disease advancing from the meatus to the *cerebrum*.

	Age.	Duration of discharge.	Acute symptoms and their duration.	Post-mortem appearances.	By whom reported.
5.—Abscess of the cerebrum (*continued*).	14	A long time, with headache.	Violent pain in the head, convulsions, coma, insensibility. Three days.	A large abscess over petrous bone containing green, fetid pus; dura mater ulcerated; bone carious.	Dr. O'Brien, 'Medico-Chirurgical Journal,' Oct. 1819, p. 235.
	14	Twelve years . .	Severe cerebral symptoms, coma, death.	A large abscess above the petrous bone, communicating with the external meatus, through petrous bone and dura mater.	Sir B. Brodie, 'Trans. of a Society for the Improvement of Med. and Surgical Knowledge,' vol. iii.
	14	Not stated; right ear affected.	Violent pain in the head, convulsions, insensibility.	A small abscess in the right middle cerebral lobe, communicating with the external meatus by an opening through the dura mater and bone.	Mr. Parkinson, 'London Medical Repository,' No. 39, 1817.
	60	Two years, followed by intense pain.	Violent cerebral irritation. Thirteen days.	Dura mater covering petrous bone detached from it and full of orifices; an abscess in cerebrum; petrous bone carious; tympanic cavity and vestibule full of pus.	M. Itard, 'Traité des Maladies d'Oreille,' tom. i, 1821, p. 255, Obs. 24.
	19	For a considerable period from the right ear.	Suddenly seized with symptoms of putrid fever.	An abscess in the cerebrum; caries of the squamous and petrous bones; pus in the mastoid cells.	M. Itard, loc. cit., p. 266.
	A young woman.	For four years deaf.	Right membrana tympani punctured, profuse discharge in twenty hours; continued for four months with pain in the forehead; acute head symptoms and rigors followed. Three days.	An abscess in the lower part of the right middle cerebral lobe; mucous membrane of tympanum thick and villous.	Dr. Butcher, 'Dublin Med. Press,' April 1, 1846.
	18	From right ear for more than a year.	Great pain in the ear, cerebral excitement, delirium, aberration of intellect, paralysis of left arm. Three weeks.	An abscess in the right cerebral hemisphere; dura mater detached from temporal bone.	Mr. Denmark, 'Medico-Chirurgical Trans.,' vol. v.

TABLE II.—*Cases of Disease in the Lateral Sinus and Cerebellum, originating in affections of the External Meatus.*

	Age.	Duration of discharge.	Acute symptoms and their duration.	Post-mortem appearances.	By whom reported.
1.—Coagulum in Lateral Sinus.*	15	Six or seven years.	Pain in right ear, shivering, headache, abscess behind the ear; great prostration. Ten days.	Coats of lateral sinus thickened; coagulum in sinus.	Dr. Abercrombie, 'The Diseases of the Brain,' 3d edition, p. 35.
	4	Pain and remitting discharge for some weeks from left ear.	Pain in the ear and head, rigors, symptoms and low irritative fever, convulsions.	Caries of the petrous bone; lateral and petrosal sinuses contained coagula.	Mr. Dendy, MS. notes sent to Author.
	17	Pain and discharge at intervals from the left ear.	Cerebral irritation, cough, excitement of the heart and of the respiration; bowels deranged. Three weeks.	The lateral sinus was distended by fibrine; the posterior wall of the external meatus,† and the bone of the mastoid cells, carious; their posterior wall, which forms the anterior boundary to the sulcus lateralis, presented a carious orifice two lines in diameter.	Mr. Pilcher, MS. notes and preparation lent to Author.
2.—Pus in the Lateral Sinus.	37	Not stated.	Pain in left ear and side of head; discharge; delirium; incoherency of mind.	Lateral, petrosal, cavernous sinuses, and jugular vein, as low as the subclavian, contained pus; cerebellum indented.	Dr. Bright, 'Medical Reports,' vol. i, p. 129.
	45	For twenty years from left ear.	Pain in left side of head, during the night only; cerebral irritation; delirium. Eight weeks.	The cavernous sinuses full of gray-coloured matter; mastoid portion of temporal bone carious.	Dr. Duncan, 'Edinb. Medical and Surgical Journal,' vol. xvii, p. 333.

* It is highly probable that these cases belong to the third series, where pus was found in the lateral sinus, and where secondary abscesses were formed.
† This layer of bone forms the anterior wall of the mastoid cells.

	Age.	Duration of discharge.	Acute symptoms and their duration.	Post-mortem appearances.	By whom reported.
2.—Pus in the Lateral Sinus (*continued*).	Boy.	Subject to discharge from the left ear.	Severe pain behind one of his eyes; delirium.	Lateral sinus contained pus, mixed with blood; its cavity continuous with the ear; petrous bone carious.	Dr. Stokes, 'Lond. Medical and Surgical Journal,' vol. v, p. 679.
	27	From right ear since early life.	Pain in head, rigors, fever; an abscess over the mastoid process; stupor; coma. Three weeks.	Lateral sinus full of pus; sulcus lateralis carious.	Dr. Bruce, 'Medical Gazette,' vol. xxvii, 1841, p. 636.
		Particulars of case not given.	. . . . .	Lateral sinus and jugular vein thick, and contained pus.	Dr. Stark, 'Craigie's Practice of Physic,' vol. ii, p. 360.
3.—Pus in the Lateral Sinus, with secondary deposits.	20	Subject to pain and discharge from right ear for six or seven years.	Shivering, headache, and pain in right ear, followed by abscess behind it. Ten days.	Abscess in left lobe of cerebellum; sulcus lateralis carious; pus in lateral sinus; secondary abscesses in the neck and in the right lung.	Dr. Heale & Author, 'Reports of the Pathological Society of London,' 1849-50, p. 271.
	Adult.	A long period.	Headache, stupor, and rigors.	Lateral sinus full of pus and lymph; sulcus lateralis carious; abscess in the neck.	Dr. Bruce, 'Medical Gazette,' vol. xxvii, p. 638.
	3½	Two years from left ear.	Pain in the ear and head; convulsions; great physical prostration. Three weeks.	Caries of meatus externus and sulcus lateralis; pus in sinus and jugular vein; abscess in neck; cerebellum soft; membranous meatus not ulcerated.	Author, 'Reports of Pathological Society,' 1850-51.

3.—Pus in the Lateral Sinus, with secondary deposits (*continued*).	35	Several weeks certainly; most probably for some years, from left ear.	Pain in left side of head; rigors; difficulty of breathing; prostration; muttering; delirium. Some weeks.	Cerebrum firm but vascular; ecchymosis on the surface of the dura mater in the left middle cerebral fossa; state of cerebellum and lateral sinus not recorded; the tympanum and mastoid cells full of pus; the layer of bone between mastoid cells and lateral sinus presented numerous small orifices; secondary deposits in each forearm.	'Post-mortem Book,' St. George's Hospital, 1847.*
	9	At intervals, for five years, from left ear.	Pain in the ear and headache; abscess behind the ear; delirium; convulsions. Five weeks.	Lateral sinus full of pus; sulcus lateralis carious, and its cavity continuous with that of the ear; purulent deposits in the lower lobes of the lungs.	Dr. Bruce, 'Medical Gazette,' vol. xxvii, 1841, p. 610.
4.—Pus on the surface of the Cerebellum.	45	Subject to discharge from left ear.	Pain in the ear and head; drowsiness; coma. Five days.	Pus deposited on the outer surface of the cerebellum, especially on left side; pus in the tympanic cavity.	Dr. Abercrombie, loc. cit., p. 59.
	Child.	Not stated.	Abscess behind the right ear; convulsions; cerebral irritation.	Pus at the base of the skull, covering the cerebellum; posterior surface of petrous bone carious; dura mater ulcerated.	Morgagni, Epist., xiv, No. 3.
5.—Abscess in the substance of the Cerebellum.	20	Not stated.	Pain in the right ear and head, followed by stupor and shiverings. Ten days.	Abscess between lobes of cerebellum; petrous bone carious; dura mater very thick; pus between dura mater and bone.	Dr. Abercrombie, 'The Diseases of the Brain,' 3d ed., duodecimo, 1834, p. 32.
	9	Stated to be subject to a discharge from left ear.	Pain in forehead; delirium, stupor, convulsions, and coma. Five days.	Abscess in left lobe of cerebellum; petrous bone carious on inner surface; only dura mater spongy.	Idem.
	19	At intervals, during two years, from right ear.	Intense headache; tenderness of abdomen; great physical prostration.	Abscess occupying nearly the whole of the right hemisphere of cerebellum; petrous bone carious and soft; tympanic cavity full of pus; cerebrum healthy.	Dr. Duncan, 'Edinb. Medical and Surgical Journal,' vol. xvii, p. 331.

* There appears but little reason to doubt that the lateral sinus contained pus.

	Age.	Duration of discharge.	Acute symptoms and their duration.	Post-mortem appearances.	By whom reported.
5.—Abscess in the substance of the Cerebellum (*continued*).	32	About two years, from right ear.	Pain in the ear and side of head; drowsiness, stupor, and coma. Six weeks.	Abscess in right hemisphere of cerebellum; petrous bone carious; an orifice communicated with the ear; dura mater ulcerated; cerebrum healthy.	Dr. Macleod, 'Medical Gazette,' vol. xvii, p. 157.
	20	Right ear deaf for two years.	Three weeks before death the membrana tympana was punctured; the operation was followed by attacks of headache and cerebral irritation.	Abscess in the right hemisphere of cerebellum; dura mater much thickened.	Dr. Butcher, 'Dublin Med. Press,' April 1, 1846.
	18	Not stated.	Pain in left ear, headache; tendency to coma; great physical depression. Eighteen days.	Abscess occupying the whole of the left lobe of the cerebellum; dura mater thick and spongy; bone sound.	Dr. Abercrombie, loc. cit., p. 104.
	20	Subject to pain in the right ear for a long time.	Cerebral irritation. Twenty-four days.	Abscess in the right lobe of cerebellum; pus on its inferior surface; dura mater ulcerated.	Lallemand, 'Recherches Anatomico Pathologiques sur l'Encephale, 1823, tome ii, p. 87.
	Adult.	For sixteen years; headaches for two years.	Headache, stupor, coma. A few days.	Abscess in the substance of the cerebellum; petrous bone and mastoid cells carious.	Dr. Macintyre, 'Proceedings of the Pathological Society of London,' 1846, p. 12.
	13	Several years from right ear.	Headache; fits like epilepsy; great depression three weeks; convalescence; sudden death.	Abscess in right hemisphere of cerebellum; external meatus and petrous bone carious.	Dr. Pilcher, MS. notes lent to Author.

A CASE OF

OBSTRUCTION OF THE COLON,

RELIEVED BY AN OPERATION PERFORMED AT THE GROIN.

BY

JAMES LUKE,

SENIOR SURGEON TO THE LONDON AND ST. LUKE'S HOSPITALS,
LECTURER ON SURGERY, AND
MEMBER OF THE COUNCIL OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND,
ETC., ETC.

COMMUNICATED BY

JAMES MONCRIEFF ARNOTT, F.R.S.

Received April 25th.—Read June 24th, 1851.

THE interest attached usually to cases of Intestinal Obstruction arising out of the obscurities by which they are attended, and the treatment of them by operation, induces me to believe, that the following may not be unacceptable to the Society. Under that impression, and with the intention of placing it in connection with those other cases of intestinal obstruction, of which its members are already cognisant, I have prepared a report for the Society's consideration.

The subject of my report is a man 60 years of age, by profession a wine cooper; thin, and of temperate habits. He applied at my residence Dec. 16th, 1850, complaining of being generally unwell. He attributed his ailment to a cold, which he thought he had taken about five weeks previously, by remaining for a considerable time in a damp cellar. He did not complain of any pain, but his countenance was

depressed; his eyes sallow, and his tongue coated. There was not any increased frequency of pulse, nor increased heat of skin. Upon inquiry, he stated that his bowels were confined, and that lately he had some difficulty in getting medicine to act upon them. His complaints were considered to be the result of ordinary constipation, and two pills containing grs. x of Pil. Rhei Comp. were ordered to be taken immediately.

17th. After the pills were taken, there was one small evacuation of lumpy fæces, but from this he did not experience any feeling of relief. He was ordered to take ʒj of Castor Oil, which he was to repeat provided the bowels should not be opened before the evening.

18th. By the continued mastication of bread (as instructed), the Castor Oil remained on the stomach four hours, and was then rejected. In the evening he took ʒss of Castor Oil, which was also rejected. This morning he feels worse, his bowels have not been relieved, and he vomits everything taken into the stomach. He complains of pain at the præcordia, and also in the neighbourhood of the cæcum, in which latter situation the abdomen is somewhat tumid, but in neither situation is the pain increased by the pressure of the hand. The skin is hot, the pulse quick, and the tongue thickly coated. The urine is scanty, and on cooling is very turbid from the deposit of lithates. He feels so unwell that he is not enabled to go to business, which he has done up to yesterday.

Ordered a blister, to be applied to the pit of the stomach, the surface of which is to be dressed with lint dipped in R. Opii. He is to take one grain of Calomel with a quarter of a grain of the Extract of Opium, every four hours; and in the evening ʒjss of Infusion of Senna, with ʒss of Epsom Salts, and ʒj of Tincture of Ginger.

19th. The sickness has ceased, and he feels better to-day. There has not been any evacuation from the bowels, and the abdomen has become more tumid, yet the pain which he spoke of yesterday, is less. The transverse colon can be

traced across the abdomen, distended and tympanitic. The blister has produced vesication.

Ordered to take two drops of Croton Oil on bread, made into pills.

20th. There has not been any action on the bowels, and the abdomen is still more distended. There is some pain over the cæcum, but not in any other part, even when pressed with the hand. The skin is cool and moist. He feels weak, and a troublesome hiccough has supervened, which occasionally distresses him much. He abstains almost entirely from food, from a fear that the taking it will cause vomiting.

Ordered a large injection of salt and water, to be thrown up the rectum; and to take fifteen grains of compound extract of Colocynth with two grains of Calomel.

21st. I requested Dr. Munk to meet me in consultation. The injection had brought away a small quantity of hardened fæces, but the medicine had not produced any evacuation from the bowels. The abdomen has become more tumid and tympanitic, and the sensation of air passing from one part of the abdomen to another, has frequently been experienced by the patient. There is little or no pain, but there is a feeling of distension. He feels weaker, and is evidently more prostrate, and the hiccough is occasionally, but not constantly, very troublesome. Both Dr. Munk and myself think there are strong grounds for supposing that obstruction exists in the bowels, but that at present it is premature to adopt that opinion definitively until further trial has been given to medicine. By way of exploration, the œsophagus tube was passed into the rectum. When introduced to the extent of twelve inches, its further progress was obstructed, and it could not be passed beyond that limit. Warm water, injected through the tube, returned immediately without bringing away any fæces.

Ordered one grain of Aloes, and half a grain of Calomel, every hour. Two drops of Croton Oil on bread to be used as a suppository.

22d. There has not been any relief from the bowels, and the patient is evidently worse. The abdomen is more distended, and the pulse has become irregular and weak.

Ordered to continue the pills.

23d. Symptoms are still worse than yesterday, and the patient has passed a very bad night. There have not been any evacuations from the bowels, and the distension of the abdomen has much increased. The hiccough continues, but the sickness has been stayed; the pulse is very irregular and weak; the countenance is pinched. With symptoms progressively becoming more severe, without reasonable grounds for hope of relief from the further administration of medicine, Dr. Munk and myself thought that the time had arrived when it was our duty to propose operative interference, under the idea that the obstruction of the bowel which, on the 21st, we strongly suspected, did really exist, and was irremediable by other means.

Before adopting that conclusion, we were fully aware of the uncertainties generally attendant upon abdominal section in such cases, and of the undesirableness of such a proceeding, except with the presence of some pretty clear indication of the seat of obstruction, by which our endeavours might be directed. Before proposing an operation, we had, therefore, to determine whether the indications in the present case, of the probable seat of obstruction, tended to remove the objections usually opposed to an operation, such as that the performance of which we now meditated on. In reviewing the previous progress of the case, it was recollected, that in its development the colon had been prominently distended, and nearly its whole course well defined through the abdominal parietes. The inference from this fact was of great importance, for it clearly indicated that the whole of the distended intestine must be above the point of obstruction, and it followed as a consequence, that the obstruction occupied a position near to its lower extremity. A confirmation of this view was derived from the introduction of the œsophagus tube which had been used, per anum, on

the 21st, when it met with obstruction to its passage about twelve inches distant from the orifice. The water injected through the tube had also immediately returned. Considering the whole of these facts in connection, we thought we were justified in concluding, that the obstruction was situated about the sigmoid flexure of the colon, a position in which such obstructions are not infrequently found. We accordingly determined to act upon that conclusion, not, however, forgetting that the conclusion was liable to be erroneous. I had next to determine the particular kind of operation which I would select for performance. Assuming the correctness of our conclusion, that operation which passes under the name of Amussat, appeared to recommend itself by the circumstance of its avoiding the necessity of peritoneal section; and was suggested to me on that account. Yet, as I thought it not prudent to assume that our conclusion respecting the seat of obstruction was certainly correct, I determined to adopt that operation which would at least give me some opportunity of extending my search, provided I did not find the obstruction at the point where it was supposed to be, thinking that the increased probability thus afforded, of finding the obstruction, would be more than an adequate compensation for the little increased danger from peritoneal section. I therefore opened the abdominal parietes near the groin. Assisted by my colleague Mr. Wordsworth, Mr. Tomkins, and Dr. Munk, I made a nearly perpendicular incision, about four inches in length, a little to the outside of the course of the epigastric artery, the lower extremity of which incision terminated a little above Poupart's ligament. This part was rendered prominent by the distended intestine bulging forward, and was selected for the above reasons, as well as for the purpose of avoiding the epigastric artery. The abdominal muscles and fascias were divided in succession, and the peritoneum opened to the extent of about two inches. The colon, greatly distended, presented itself at the opening, with a considerable tendency to protrude; this, however, was ob-

viated by the hand. When a finger was introduced, serous fluid, to the extent of several ounces, made its escape, and when the finger was passed along the surface of the intestine in a downward direction, it came in contact with a hard diseased mass, which appeared to encircle the intestine, and limit the extent of its distension. This was recognised to be a stricture. Having thus clearly ascertained the precise seat of obstruction, and its cause, I proceeded to open the intestine above the part obstructed. This was accomplished at the part which presented itself at the opening in the parietes, by means of a longitudinal incision through the tunics to the extent of about one inch. Through the aperture thus made, half a chamber-utensil full of fluid fæculent matter made its escape, after which the patient expressed himself much relieved. The finger was next introduced, through the intestinal aperture, towards the rectum, when it was ascertained that the colon had been rendered impervious by the stricture, about two inches from the aperture. Having thus satisfactorily accomplished the object of the operation, the wound was partially closed by two sutures, the lowest of which was passed through one of the appendices epiploicæ which lay conveniently for the purpose; this being done with the intention of securing a correspondence between the intestinal and parietal apertures, for the more ready discharge of fæculent matter through the wound. The surface was loosely covered with lint, and the patient replaced in bed. He was but little exhausted by the operation, and did not sustain a greater exposure of the peritoneal surface than is common in the ordinary operation for strangulated hernia. Twenty drops of Tr. Opii were ordered to be taken immediately, and brandy-and-water and beef-tea occasionally.

Dec. 24th. The patient has passed a good night, and is much better this morning. He is cheerful, and talks of his recovery, and of his return to business. The pulse has recovered its regularity, and has more strength. The attendants state that more than half a pailful of fæces has

passed from the wound during the night, and the abdomen has become flat and free from tympanitis.

Ordered nourishment and brandy-and-water, and the parts to be kept very clean by the frequent removal of the discharges which take place from the wound.

25th. He has passed an indifferent night, and is not so well as yesterday. He is more exhausted, and the tongue and mouth are dry. The instructions respecting cleanliness have not been attended to, and the thigh and lower part of the abdomen have, in consequence, remained covered with fæces. He complains of this neglect, and is much irritated. To obviate this, in future, a constant nurse is to be provided.

Ordered 20 drops of Tr. Opii at bedtime, and an addition to the nourishment and stimulus.

26th. He has slept well during the night, and is recovered from the depression of yesterday. His tongue is moist, and his pulse good. He is free from pain, and can bear the pressure of the hand on the abdomen without inconvenience. The surface which was yesterday covered with fæces, is now affected by erysipelas.

Ordered to continue the use of nourishment, and to take half a bottle of wine daily. Collodion to be applied to the erysipelatous surface and surrounding part.

27th. In all respects better. Erysipelas has disappeared. The nurse reports that two stools have been passed per anum, but fæces continue to be passed through the wound. He says he is weak, yet his pulse is good, and his tongue clean.

Ordered, Collodion to be again applied to the surface near the wound, for its protection from fæcal discharges.

Jan. 1st. He has continued to improve since the last report, and several evacuations have been passed per anum. His appetite is as good, or nearly so, as in health. I found him raised in bed eating his dinner. The position has caused a tendency to protrusion of the intestine at the wound. The sutures have ulcerated and were removed, their place being supplied by pieces of adhesive plaister drawn

across the upper part of the wound. To prevent the tendency to protrusion, the patient was ordered to keep in the recumbent position, and a cushion was bound over the part for its support.

20th. The improvement has been uniform since the last report. For some days the wound has been healed, with the exception of that part corresponding to the aperture in the intestine. The mucous membrane of the intestine projects slightly through the aperture of the parietes, which is of sufficient size to admit the point of the finger, nor does it appear to have any disposition to contract. There is but little fæculent discharge at this aperture, and that little is restrained by the use of a pad and circular belt. The fæces are almost wholly passed per anum. The strength has very much increased, and his appetite is excellent. During the last few days he has walked out, and to-day has walked a distance of two miles. It was intended to attempt the dilatation of the stricture by the introduction of bougies through the wound; the passage of fæces by their natural course has been so free, and apparently unobstructed, that this intention has been considered unnecessary to be acted on. The only direction given, is to support the part, and close the aperture by the continual use of the pad and belt.

30th. The passage of fæces, per anum, has again ceased. A bougie having been introduced through the groin, they again partially returned to their natural channel; the greater part, however, pass by the opening at the groin, and some inconvenience has been experienced from their constant tendency to escape. A well-fitted truss has been used with success to obviate this tendency, since the use of which he has suffered but little inconvenience, and has been enabled to pursue his ordinary occupation to the present time almost without interruption.[1]

[1] August 20th. To this date the patient has continued at his employment without interruption, nor has he found it necessary to be absent for a single day. The wound at the groin remains nearly as at the last report in January, and the truss effectually prevents the escape of fæces, and, from

The foregoing case furnishes a good illustration of a class of obstructions probably of more frequent occurrence than any other affecting the intestinal canal. In connection with it arise some interesting and important practical considerations. In the first place, it may be worthy of remark, that difficulties and dangers which always attend obstructions, occupying the upper part of the intestinal tube, are, in some degree, mitigated in those forms which occupy its lower extremity; and symptoms, which in the former run their course to a fatal termination, with a rapidity which leaves little time for deliberation, in the latter, are often gradual and insidious in their access, and slow in their progress, so that many weeks may elapse, even when unrelieved, before they become fatal. Exceptional cases, however, not infrequently occur, which demand a promptitude of relief equal to that demanded by any other class. There can be little doubt, that in every case of ascertained mechanical obstruction, protracted delay militates greatly against the success of operative proceedings when ultimately adopted, and on that account should be avoided as far as the circumstances of the case will admit. In this respect the above case contrasts favorably with one of a similar nature, which occurred to me some time since at the London Hospital, and reported in Mr. Phillips's excellent paper on Intestinal Obstructions, published in the Thirty-first Volume of the Transactions of this Society. In that case the thirteenth day of total obstruction had elapsed when I first saw the patient. On the fourteenth day an operation similar to that in the present case was performed. On the following day the patient died. Examination revealed a rupture, to the extent of six inches of the peritoneal tunic, at the transverse colon, which had doubtless taken place through over-distension. On the other hand, it is difficult, if not impossible, to

this circumstance, he suffers very little inconvenience. A part only of the fæces is discharged at the groin; the remainder passes naturally, per anum. The patient reports himself well in general health, and nearly as strong as before the operation.

determine with certainty the dependence of symptoms upon mechanical obstruction, at an early period of their development; or to distinguish them from symptoms arising from constipations, the result of arrested function. Time alone, in many, makes manifest the true state of the case, and although this involves a necessity of delay, there appears to be no other advisable alternative. The difficulties of diagnosis are, therefore, the principal obstacles to a prudent, yet decided and effective, course of treatment in many of these forms of disease, and it consequently becomes a matter of more than usual importance, and requires the most careful study in each case. The attention which this subject has already received from Mr. Phillips, in the valuable paper referred to, renders it unnecessary that I should enter upon it at large. But I might observe, that symptoms of mechanical obstruction should be admitted with extreme caution, for the reason, that they are more or less common to these and to other affections. Thus pain, constipation, sickness, and distended abdomen, may depend upon mere functional disturbance, and either separately or in combination, while some of them may be absent, or exist in a very slight degree under the actual presence of mechanical obstruction. With respect to pain, little information is generally to be derived from this symptom, which will serve the purposes of diagnosis. In some cases, it is a severe attendant upon obstruction, in others, it is absent, or exists in a slight degree only. It is important to mention, that, when present, it is not generally referred to the seat of obstruction, but to some other and distant part. If relied on by the surgeon as a guide to the obstruction, it may therefore mislead, when the question of the position of an operation becomes a matter to be determined on. Thus, in five cases of obstruction at the sigmoid flexure of the colon, the pain was referred by the patients to the region of the umbilicus, a circumstance illustrative of the little dependence which should be placed upon the symptom of pain in directing the course of surgical proceedings in such cases.

With respect to constipation, although this symptom is present in all forms of mechanical obstruction, it is equally so in some forms of mere functional derangement. In the case of a female, I was witness to the persistence of constipation for a period of thirteen weeks; in that instance it was the result of functional disturbance, and was relieved by the administration of purgatives.

Distended and tumid abdomen is also a symptom common to mechanical obstruction and to functional inactivity, and in both may be attended by uneasy feelings to the patient. Although distension of abdomen may not generally be deemed characteristic of mechanical obstruction, yet when the many other circumstances, which are usually to be considered, lead to the supposition of its existence, it becomes a very important evidence as bearing upon the demonstration of its seat; and, in combination with the information derived from the introduction of the œsophagus tube per anum, will frequently determine the diagnosis with sufficient accuracy for all practical purposes. In availing ourselves of these means, due caution is requisite, for unless this be observed, erroneous conclusions may be the result. The affirmative evidence which a generally distended colon affords, I have hitherto considered sufficiently conclusive that the seat of obstruction occupies its lower part, for the reason, that distension of intestine is limited to that part which lies above the part obstructed. The interference, however, of much fat on the abdominal parietes, or a general distension of all parts of the intestinal canal, may obscure the defined contour of this viscus, which is present in most cases, and render any conclusion from this source uncertain or difficult.

In like manner, the œsophagus tube, when introduced per rectum, will be adequate to detect any obstruction within its reach. But in using it, it is necessary to recollect that the tube may be entangled in the folds and flexures of the intestine, or in coming in contact with an obstruction, may be bent, and return towards the rectum. In the first

case the error may arise of supposing that an abnormal obstruction exists, when there is no such obstruction; in the last that there is not any obstruction when obstruction is present. The latter source of error is detected by the introduction of the finger into the anus. With due care in the combined use of these two means of diagnosis, I believe reliance may be generally placed in them for the purpose of determining the seat of obstruction when it is situated in the lower part of the colon.

When the diagnosis has been thus determined, the consideration arises, what kind of operation is best to be performed in these cases. Two have been proposed and performed, the one by Amussat, and performed in the loins, the other by Littre, and performed in the groin.

In the present instance the operation preferred was that of opening the abdominal parietes at the left groin. Having witnessed its results, and duly considered its details, I am disposed not to regret the preference which I adopted. The operation of Amussat, performed as it is at the loins, has the appreciable advantage of not requiring an opening to be made into the cavity of the peritoneum, by which circumstance the important object is obtained of diminishing, in some degree, but not entirely removing, the probability of the occurrence of peritoneal inflammation. The demerits of the operation, however, are several, and possibly, upon review, will be considered to outweigh the foregoing advantage, even in reference to the question of danger.

Foremost amongst these, may be stated the impossibility of doing more for the patient's relief than opening the colon at the seat of operation; indeed this seems to be the only object for which it can be undertaken. It is, however, important to recollect, in reference to this matter, that obstructions, even at the lower extremity of the colon, may not always be of a character to require such opening, and in some of them the opening of the intestine may be improper. Thus there are obstructions occasionally occurring, produced by fibrous bands overlying the intestine, or by stran-

gulations, in either case the result of causes acting exteriorly to its tunics. The proper treatment in such cases is to divide the bands, or relieve the cause of strangulation. The mere opening of the intestine above the seat of obstruction, would probably be insufficient for effectual relief, since unremoved constriction or strangulation would be likely to continue their ordinary injurious effects upon the tunics of the intestine, and to lead to the most serious of its usually attendant consequences. This demerit derives additional weight from the circumstance of the surgeon's inability to predicate the cause of obstruction, and his consequent liability, on the one hand, to make an opening, and inflict an injury, which the circumstances of the case may not have demanded, and on the other, to leave that unrelieved which the emergency really required.

When the diagnosis is correct, and the opening necessary from causes existing within the tunics of the intestine, experience has amply shown that the lumbar opening is sufficient for the purpose in view of relieving the distended colon; yet, in the event of an error in diagnosis, it does not provide any facilities for its correction, and the surgeon is dependent upon one venture for success. The danger of total failure of affording relief consequent upon this state of things, must therefore be attributable as a demerit to the operation in the loins. It is scarcely necessary to mention, that lesser, but still important, evils result from position of the operation. Thus, in this position, the fæculent discharges which necessarily continue to pass from the intestine through the opening, cannot be conveniently attended to by the patient himself; while experience has shown that the disposition to contraction in the wound arising from its great depth, may occasionally produce interruption to their escape, and require renewed surgical interference.

In all these particulars, with the exception of the necessary attendant of peritoneal section, the operation of opening the abdominal parietes at the groin, as in the above-related

case, in all cases of obstruction or suspected obstruction in the lower part of the colon, appears to me to be the operation which should be preferred.

It affords facilities for modifying the treatment, as may be advisable after immediate examination of the cause of obstruction, either by opening the intestine when incapable of relief by other means, or by dividing or removing any existing cause of constriction or strangulation. It enables the surgeon to extend his search within a limited range, when his diagnosis of the seat of obstruction has been proved to be incorrect. When requisite and proper, it enables him to open the colon close to, or nearly close to, the seat of obstruction, and thus preserve to the patient, for the performance of its proper function, the utmost extent of intestinal canal of which the case is susceptible; and it eventually secures to him those facilities for attending to his own comfort, which appear almost a necessary condition to make life endurable under such circumstances.

ON THE VARIATIONS OF THE SULPHATES AND PHOSPHATES EXCRETED IN ACUTE CHOREA, DELIRIUM TREMENS, AND INFLAMMATION OF THE BRAIN.

BY

H. BENCE JONES, M.D., A.M. (CANTAB.), F.R.S., F.C.S.,
PHYSICIAN TO ST. GEORGE'S HOSPITAL.

Received May 1st.—Read June 24th, 1851.

IN the Medico-Chirurgical Transactions for 1847, some cases are recorded of the variations of the quantity of phosphates excreted by the kidneys in delirium tremens, and in inflammation of the brain. I stated in conclusion, "that the excess of action, or the want of action of oxygen, may possibly ultimately be proved by the balance, not only to be traceable by its effect on the nervous tissue, but that other tissues may give a corresponding result; with this view, the variations of the sulphates in disease deserve the most careful investigation."

In the present communication, I purpose to relate the most remarkable cases I have met with of the variation of the sulphates in disease.

Generally, the variation of the sulphates and phosphates in the healthy urine of a person on mixed diet, taking moderate exercise, may be stated thus:—

The sulphates vary—

	Specific gravity.
After food, from 11·85 grs. of sulphate of baryta per 1000 grs. urine,	1033·9.
Before food, to 7·93 grs.	1026·5.

The phosphates vary—	Specific gravity.
After food, from 7·22 grs. of phosphate of lime, per 1000 grs. urine,	1030·0.
Before food, to 7·96 grs.	1027·9.

(See 'Philosophical Transactions,' 1845 and 1849.)

Having determined the variations of the sulphates in the state of health, when different diets, and different amounts of exercise, and different medicines were taken, I proceeded to examine the variations of the sulphates in disease. At the same time, the total amount of alkaline and earthy phosphates was determined, partly in order to see whether the amount of sulphates and of phosphates bore any relation to one another, and partly to test the conclusions which were drawn in my previous paper, on the variations of the phosphates in disease.

The detail of 58 cases, in which 148 determinations of the amount of sulphates and phosphates were made, would be too long for this Society. But a few of the most interesting examples out of the most important classes into which the cases were divided, may possess some interest, and not be too tedious.

The cases were thus classified:—

1. Acute and chronic diseases, in which the muscular structures were chiefly affected.
2. Functional diseases of the brain, as delirium tremens and some other forms of delirium.
3. Acute inflammatory diseases of the nervous structures.
4. Chronic diseases of the nervous structures.
5. Acute diseases, in which neither the nervous nor the muscular structures were chiefly affected.
6. Chronic diseases, in which neither the muscular nor the nervous structures were chiefly affected.

The last three classes I shall not dwell on here, as they gave only negative results. The numbers obtained in the analyses will be found in the 'Philosophical Transactions' for 1850. In the first three classes respectively, cases of chorea, of delirium tremens, and of inflammation of the brain are included; and it is the variation of the sulphates and phos-

phates in these diseases, which I purpose to illustrate by the most marked cases which came under my notice.

First, then, on the amount of Sulphates and Phosphates in that disease in which the muscular structure is chiefly affected, namely, chorea. Chronic chorea gave me no marked results; but the following cases of acute chorea, that is, in which the muscular motions were so intense and so continuous that life was endangered, gave a most decided increase of the sulphates, without any increase in the phosphates of the urine.

Class I.

Case 1.—Mary B—, æt. 19, Holland Ward; admitted March 8, 1848, having for the first time had rheumatic pains in the lower extremities for three days. The skin was hot; pulse 120, full and hard; tongue white; great thirst and loss of appetite; bowels confined. The right knee was swollen and very painful on pressure, but not red. The ankles were hot, red, and swollen, and very tender. There was a soft murmur heard with the first sound of the heart, and some pain in the epigastrium. Venesectio ad ℥xij, Cal., gr. x; Opii, gr. ½; hac nocte; ht. Seunæ cras; ht. Ammoniæ Citr., 4^{tis} horis.

9th. Passed a restless night. The pains becoming worse when she perspired in bed; ankles less swollen, but the elbows and wrists are now affected; pulse quiet; blood buffed and cupped; heart's action is increased, but no murmur is heard to-day.

10th. Had slight wandering and could not sleep at all. She lies very low in bed; has a slight cough; perspires very much; countenance is uneasy; so much pain in the joints that she cannot have the bed-clothes on her; bowels open; pulse quiet. Cal., gr. iij; Opii, gr. ½, ter die.

11th. Catamenia appeared this morning.

13th. There was pain in the region of the heart, and she was cupped to ℥x; the mouth was sore.

16th. There was pain in the left side; frequent cough; and pulse 120. She was bled to ℥xiv, and put again on fever diet; she had had beef-tea, a pint for two days.

17th. Blood buffed and cupped. The pains were relieved.

21st. Broth diet.—22d. Fish diet.—27th. Swellings, pain, and redness are gone. She sleeps well; tongue clean; bowels open; appetite good. Ordinary diet.

April 3d. Improving; slight pains occasionally.

8th. WAS ATTACKED WITH CHOREA this morning. Broth diet was ordered.

10th. Hydrarg. Chlor., gr. iij; statim et ter die; Ht. Sennæ cras mane. Heart's action very rapid.

11th. Ulcers on the side of the tongue, which have the appearance of aphthæ; valvular murmur very distinct towards the apex; motions very dark. Rep. Calomel, ht. Sennæ cras; ht. Nitri c. Vini Ant. Tart., ʒj, 6^{tis} horis.

12th. Has been very violent during the whole of the night. Hirudines viij; reg. pub. statim.

13th. More quiet this morning, but very violent during the night. Gums red; pulse 120. Valvular murmur towards the apex; has had no sleep; water caught this morning scanty, thick, gives a deposit of much reddish brown urate of ammonia, contained a minute quantity of albumen, and about four ounces in quantity, became very pink on the addition of ammonia. Specific gravity = 1032·3.

516·15 grs. boiled with Chlor. of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 12·95 = 25·09 grs. per 1000 urine.

After being re-treated with acid, and re-washed.

516·15 grs. precipitated by Chlor. of Calcium and Ammonia. Total phosphates = 0·35 = 0·68 grs. per 1000 urine.

Some hours afterwards the same day about an ounce and half of water was again caught. It was thick, as before, from urate of ammonia. Specific gravity = 1035·2.

517·60 grs. boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 11·25 = 21·73 grs. per 1000 urine.

After being re-burnt and re-treated.

Ht. Sennæ statim. Adde sing. haust. Vini Colch., ♏x; Liq. Potassæ, ♏xx.

14th. Has been very violent the whole of the night; had no sleep; ulceration on the tongue much increased; has been inclined to sleep during the morning; bowels well open. Bal. Calidum. Liq. Amm. Acet., 3vj; Amm. Sesqui-carb., gr. ij; Sp. æth. Nitr., 3j; ht. Piment. 3vj; 6^{tis} horis; ht. Morphiæ hac nocte.

15th. Has slept a good portion of the night, and seems disposed to continue to do so; is very quiet this morning. Did not have the bath, because she was so very violent. Skin very hot; bowels not open since yesterday; passes her water in bed; sweats very much; tongue very much loaded. Irregular spasmodic movements of the hands very much less. Rep. Mist. et ht. Sennæ si opus est.

16th. Was very restless and disturbed during the night; bowels not open; water passed this morning thick, chiefly from urate of ammonia, and contains a trace of albumen; she is much quieter than she was. Specific gravity=1030·0.

515·00 grs. boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . .=3·75=7·28 grs. per 1000 urine.

515·00 grs. precipitated by Chloride of Calcium and Ammonia. Total Phosphates (not pink) . . .=3·80=7·38 „

17th. Had morphia last night; had a very quiet night; bowels opened without the aperient; water passed this morning, paler colour, slight cloud of urate of ammonia, acid. Specific gravity = 1013·1.

506·55 grs. boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . .=1·30=2·56 grs. per 1000 urine.

506·55 grs. precipitated by Chloride of Calcium and Ammonia. Total Phosphates . . . . . .=2·20=4·34 „

18th. Has passed a most excellent night; there was no necessity for a night draught; herpes about the lips. Perst. Hydr. c. Cretâ, gr. iij; Doveri pulv., gr. ij, bis in die.

19th. Passed a very quiet night. Perstet.

20th. Slept well during the night, and is much better

this morning. Gums red and sore; systolic sound is much softer; pulse 84. Rep. pulv. et mist.

22d. Gums affected with mercury; systolic murmur much softer; pulse 84. Fish diet.

24th. Ordinary diet. Ht. Sennæ alt. mane. Perst.

25th. Does not seem able to collect her thoughts; twitching of the hands and legs rather less.

26th. Ht. Ammoniæ Citr., 6^{tis} horis.

May 2d. Vini albi, ʒij quotidie. Rep. ht., ter die.

4th. Right knee and ankle very red, and swelled, and painful. Cal., gr. iv; Opii, gr. ½, hac nocte; ht. Sennæ cras mane. Broth diet. Vini Ant., ♏xx; Vini Colch., ♏x; mist. Camph., ʒxj, ter die.

5th. Ankle and knee rather better.

6th. Left ankle and knee rather swelled and painful. Ht. Colchici c. Opio, nocte maneque. Ht. Sennæ cras mane et pro re natâ.

7th. Much better this morning. The irregular spasmodic actions still continue, and she does not appear to have it in her power to express what she means.

8th. Ht. Colch. c. Opio, hac nocte. Ht. Salin. ex Ammoniâ, ter die.

9th. Continues to improve. Ordinary diet.

12th. Bowels not open; pains in the knees and ankles quite gone; the spasmodic movements of the hands and feet still continue without much change; she seems better able to collect her thoughts.

16th. Going into the country. Relieved.

The variations of the sulphates and phosphates may be tabulated thus:—

		Sulphate of Baryta per 1000 grs. urine.	Specific gravity.	Total Phosphates.
On the 5th day, after	Sulphate of Magnesia.	25·09 grs.	1032·3	0·68 grs.
„ 5th day later	„	21·73 „	1035·2	
„ 8th day, quieter,	„	7·28 „	1030·0	7·34 „
„ 9th day	„	2·56 „	1013·1	4·70 „

In this case the Sulphate of Magnesia which was given interferes with the result, and renders it less conclusive than

it would otherwise have been. The diminution of the phosphates is very remarkable, and probably arose from the small quantity of food which could be taken.

Case 2.—Charles G—, æt. 8, Hope Ward; admitted Nov. 16, 1849. Had scarlet fever three weeks previous to his admission. Was attacked by chorea three days ago; it is supposed, in consequence of cold, as he got out of bed in his night shirt without his shoes, and crept through a hedge into a field, where he was found in consequence of his cries. When brought home he had a rigor, and two days afterwards the chorea began. On admission he was not able to stand or to feed himself. He slept well; but the fits of motion came on always stronger at night than during the day. His face was flushed. He took two minims of Liq. Potassæ Arsenitis thrice daily, with aperients, and afterwards he took bark. In a week he improved; and about Christmas he was able to feed himself and to walk across the ward without help.

December 31st. This day very excited and very weak. He was ordered to omit the bark, and to take two teaspoonfuls of wine every four hours. From this day violent spasmodic action commenced, which hindered him from obtaining any sleep, and prevented him from taking but very little food.

January 2d. Can get very little sleep, is "continuously on the work in every muscle." Able to swallow only a little arrowroot and wine.

3d. The bark was continued. His motions were very violent, altogether preventing all sleep. The face was very flushed.

4th. Strong muscular action continues. Obtains no sleep. Has been unable to speak for the last four days, from the involuntary motions of the tongue. He was this day ordered the sixth of a grain of tartarised antimony every six hours.

5th. Rather more quiet and has had a little sleep. Urine passed this morning at half-past ten, a.m., the first that could be obtained throughout this period of excitement, was of a light yellow colour. Gave a very large deposit

of urate of ammonia. Was acid to test-paper; gave with nitric acid immediate crystallisation of nitrate of urea. Specific gravity, 1030·6.

515·3 grs. precipitated by Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 5·80 = 11·25 grs. per 1000 urine.
515·3 grs. precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . = 1·70 = 3·29 „

6th. Has had a good night, and is much quieter. Tongue furred; pulse 84, weak; asked for his dinner. The urine passed at ten, a.m., was obtained; gave a large deposit of urate of ammonia. Specific gravity = 1031·8.

515·9 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 5·50 = 10·66 grs. per 1000 urine.
515·9 grs. precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . = 1·30 = 2·52 „

7th. Urine passed early this morning. Had the same appearance as yesterday. Specific gravity = 1031·2, gave crystals of nitrate of urea immediately on the addition of nitric acid.

515·6 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 5·75 = 11·15 grs. per 1000 urine.
515·6 grs. precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . = 1·31 = 2·54 „

9th. Urine passed this morning early, the involuntary motions being much less. Specific gravity = 1028·4; urine acid to test-paper; still gave a large precipitate of urate of ammonia.

514·2 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 3·80 = 7·39 grs. per 1000 urine.
514·2 grs. precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . = 1·80 = 3·50 „

10th. Pulse 84; much quieter; has taken his dinner of arrowroot; is still hardly able to protrude his tongue, in consequence of the involuntary motions; urine passed early this morning. Specific gravity = 1018·6; much clearer, more plentiful, and rather paler.

509·3 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 2·00 = 3·92 grs. per 1000 urine.
509·3 grs. precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . = 0·80 = 1·57 „

14th. Has continued improving, becoming quieter each day; pulse 84; tongue slightly furred, and protruded more slowly and steadily. Has taken no solid animal food whatever; since the 6th of January, his food has been arrowroot, milk, and beef-tea. Has continued two ounces of wine daily. Urine passed this morning quite clear. Specific gravity = 1016·0.

508·0 grs. boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . = 2·20 = 4·32 grs. per 1000 urine.
508·0 grs. precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . = 0·70 = 1·37 „

April 11th. Has been gradually improving up to this time. Urine passed this morning, acid; not of a deep colour. Specific gravity = 1030·6.

515·8 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 4·20 = 8·01 grs. per 1000 urine.

He has for some time had full diet, and been able to take some exercise. His weight, about this time, was only 34lbs., and his height 4 feet 1 inch. He remained in the house until the end of May, when he went home; he became much more unsteady almost immediately after his return, and he was readmitted under my care on June 12th. He remained suffering from chronic chorea for some months; he went out, but

very slightly improved; all medicine was omitted; no further treatment was adopted, and he came to his Ward on January 21st, 1851, perfectly steady, and much stouter than when he left the house. He says that within a month after leaving the hospital, he got quite well, without taking any medicine; and since then he has grown stout. Can walk about quite steadily, face full and fat, and complexion ruddy.

The variations of the sulphates and phosphates may be arranged thus:—

	Sulphate of Baryta.	Urine.	Specific Gravity.	Total Phosphates.	Urine.
6th day, very violent	11·25 grs.	per 1000	1030·6	3·29 grs.	per 1000
7th day „	10·66	„	1031·8	2·52	„
8th day „	11·15	„	1031·2	2·54	„
10th day, much quieter	7·39	„	1028·4	3·50	„
11th day „	3·92	„	1018·6	1·57	„
102d day „	8·01	„	1030·6		

When it is remembered that this patient was only eight years old, weighing, at this time, less than 34 lbs., and taking scarcely any food, the increase of sulphates is most remarkable. When the sulphates were most, then an excess of urea was always detectable. The phosphates were not increased, nor indeed (though the abstinence from food was excessive) are they remarkably diminished.

The comparison of the amount of sulphates on the 6th, 7th, and 8th days, when the disease was at its height, and on the 102d when the patient was convalescent and eating full diet, is worthy of remark.

Case 3.—Elizabeth C—, æt. 23, servant, Queen's Ward; admitted March 27, 1850. Had slight chorea for a fortnight previous to her admission, and had been out of health during the winter. Particularly observed to be more irritable in her temper, and to have lost her sleep. No appearance of worms had been noticed in the motions. She was given ordinary diet, with an aperient of Calomel and Scammony, five drops of Liq. Potass. Arsenitis three times daily. She was not obliged to keep her bed.

31st. The nurse observed that she was strange in her

manner, and she went to bed in the afternoon because she felt ill. She vomited; and was much more unsteady than she had previously been.

April 1st. The catamenia appeared. She became very restless, and the face was much flushed; at night she was delirious. The bowels not having acted, she was ordered Pul. Cal. c. Jalap., ℈j, statim; ht. Sennæ, post horas tres.

2d. The symptoms remain the same. The urine passed late in the evening was of a reddish colour, contained a thick deposit of urate of ammonia; on the addition of caustic ammonia, the red colour of senna and alkali appeared. On the addition of nitric acid, an immediate crystallisation of nitrate of urea formed. There was also a trace of albumen. The urine was acid to test-paper; and very decidedly acid on the 6th. Specific gravity = 1036·0.

518·0 grs. boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . = 10·30 = 19·88 grs. per 1000 urine.

Ice was applied to the head. Two pints of strong beef-tea, and a pint of milk, for her food. Liq. Opii Sedativi, ♏xv; Sp. Æth. Sulph., ʒss; ht. Piment., ʒxj, 6^{tis} horis; Ferri Sesquioxyd., ʒss, e. fæce sacchari 6^{tis} horis alternis; Enema Vesp. c. P. Jalapæ, ʒiij.

3d. Ol. Ricini, ℥ss, statim. Enema commune cras cum ht. Sennæ, ℥j. Chorea very violent.

4th. Remains in the same state; catamenia still slightly present. Vini Rubri, ℥ij, ter die; urine passed this morning very deep coloured; contained scarcely a trace of albumen; gave a very large precipitate of urate of ammonia; and on the addition of nitric acid, it gave an immediate crystallisation of nitrate of urea. Acid to test-paper. Specific gravity = 1033·8.

516·9 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 8·20 = 15·86 grs. per 1000 urine.

5th. Still continues delirious, and in violent motion, though the spasmodic action is less violent to-day. No

water had been passed from twelve o'clock midday yesterday, excepting a small quantity, which was passed involuntary under her. At twelve o'clock this day the water was drawn off, in quantity 32 ounces; deep coloured, gave a plentiful deposit of urate of ammonia. No trace of albumen. Acid. Specific gravity = 1028·4.

514·2 grs. boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . = 7·10 = 13·80 grs. per 1000 urine.
514·2 grs. precipitated by Chloride of Calcium and Ammonia, Total Phosphates . . . . = 3·35 = 6·51 „

6th. Urine drawn off to-day at twelve o'clock. Not so deep coloured. No deposit of urate of ammonia. Did not give with nitric acid an immediate precipitate of nitrate of urea. Contained no albumen. Specific gravity = 1026·8.

513·4 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 4·80 = 9·36 grs. per 1000 urine.

7th. The last twenty-four hours she has become much quieter; but she bursts into fits of crying without any reason. Urine drawn off at twelve o'clock, about 19 ounces, not so deep coloured. Gave no deposit of urate of ammonia. Contained no albumen. Specific gravity = 1025·4.

512·7 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 3·10 = 6·08 grs. per 1000 urine.

8th. Urine passed by herself without the catheter, much paler colour. Tongue coated at the back. Skin perspiring much. Is lying nearly quiet; much exhausted, but free from spasmodic motions.

12th. Is gaining strength. Urine made last night, and early this morning. Acid; clear. Specific gravity = 1016·4.

508·2 grs. boiled with Chloride of Barium and dilute Nitric Acid, Sulphate of Baryta . . = 2·40 = 4·72 grs. per 1000 urine.

17th. There is the slightest spasmodic action of the muscles.

21st. She went out steady. Able to walk well.

The variation of the salts may be seen in the following table:—

	Sulphate of Baryta.		Specific Gravity.	Total Phosphates.
3d day, very violent	19·88 grs.	per 1000 urine.	1036·0	
5th day „	15·86	„	1033·8	
6th day „	13·80	„	1028·4	6·51 grs. per
7th day „	9·36	„	1026·8	1000 urine.
8th day, much quieter	6·08	„	1025·4	
13th day „	4·72	„	1016·4	

On the 3d day the amount of sulphates depended on the sulphate of magnesia, as well as on the violent action of the muscles. Nitrate of urea crystals formed immediately on the addition of nitric acid to the urine.

The 5th and 6th days, no salts were taken, and the increase of the sulphates was very decided. The urea was also in excess. The phosphates were not diminished. As the muscular action became quieter, the sulphates in the urine diminished.

Cases of acute chorea as severe as these are very uncommon. From the commencement of this investigation I have, as yet, seen but one other case; and in that, also, the urine immediately gave evidence of an excess of urea. To the eye the amount of Sulphates precipitated by chloride of barium, after boiling with hydrochloric acid, appeared to be in excess. But this mode of estimating the amount of Sulphates without the balance, is too uncertain to be trusted.

It is worthy of notice, how high the specific gravity of the urine is in the three cases related; this was not only owing to the amount of urea in solution, but still more to the amount of Sulphates. These salts increasing the specific gravity three times as much as an equal quantity of urea would do.

I pass on, secondly, to the amount of Sulphates and Phosphates in some functional diseases of the brain. The following four cases of delirium tremens I place in this class.

Class II.

Case 1.—Jessie P—, æt. 39, Fuller Ward; a carpenter, and keeper of a beer-shop. Admitted March 29th, 1847.

Said to have had a fit three years ago; and last Christmas is said to have had another fit, which was thought to be apoplectic. On the 20th of this month he again felt the warning of a fit. For this he was bled to syncope, and the bleeding was repeated, but this treatment did not avert the fit; after the fit he was blistered and mercuralised. He then became delirious, but got some sleep at intervals, and remained in this state until Saturday the 27th. The delirium then became very violent indeed, and he has not slept since. When brought to the hospital, he struggled violently and talked incessantly, and there was constant and general tremor of the lips and hands. Though he was reported to be a sober man, yet, on inquiry, it turned out that he was much the contrary. 6 p.m., skin pale and clammy; pulse scarcely perceptible; right pupil very much dilated; left, very much contracted and not acting. Passed some urine in bed at 10 o'clock in the evening. Bowels not open. Emp. Canth. Nuchæ; Tr. Opii, 3ss; Sp. Ammoniæ Aromat., 3ss; Sp. Ætheris C., 3j; Aquæ Pimentæ, ℥jss; statim. Rep. ht. sine Tr. Opii, 2^{dis} horis.

10th day, 30th. Has been very violent all night; has had no sleep; took four ounces of brandy during the night. Bowels not open at half-past 10, a.m. Enema statim.

2 p.m. Four ounces of water drawn off; acid, contained oxalate of lime, slightly albuminous, with some fibrinous casts. Specific gravity = 1024·74.

	Re-treated.	
512·37 grains of urine, precipitated by Chloride of Barium, and Acid; Sulphate of Baryta	= 8·87	= 17·31 grs. per 1000 Urine.
512·50 grains, precipitated by Chl. Cal. and Ammonia, Phosphate of Lime	= 0·45	= ·87 „

The tongue was dry, and the teeth covered with black sordes.

Enema, Terebinth., statim. Rep. Vespere.

Sp. Ammoniæ Arom., ʒss; ht. Nitri, ℥jss, 3^tis horis. Hyd. Chlor., gr. iij, tertiis horis.

The pupil of the right eye has been much larger than the left for nearly twenty years. It is stated that he could see best with the left eye.

Died at half-past 9, p.m.

Examined at home by me, April 1st, half-past 4, p.m.

No signs of decomposition. Skull thick; brain not wet, firm; slight opacity under the arachnoid; ventricles of the brain not distended, contained a small quantity of clear fluid; choroid plexus of a purple colour; puncta of blood in the substance of the brain more than usual; base of the brain healthy; no clot or softening in any part could be found.

Right kidney healthy, with a speck of white deposit in the cortical structure; capsule readily removed.

Left kidney, capsule could, with great difficulty, be torn off in many places; the capsule split, so as to leave a layer adhering to the surface of the kidney. The surface was covered with cysts, some larger than a split pea, full of gummy, soft, solid matter; these extended in places deep into the cortical structure of the kidney, and in some places encroached on the pyramids. Some white spots were seen similar to that in the right kidney. There was but a small portion of this left kidney that was not studded with these cysts; but where they were absent, the kidney appeared healthy. The pelvis of neither kidney was injected. There was much fat around the pelvis of the left kidney.

The heart was large and flabby; the auricles dilated and containing coagula; the valves were all healthy, but there was much atheromatous and osseous deposit at the commencement of the aorta. There were no tubercles in the lungs. The other organs were not examined.

In the single analysis given in this case, the Sulphates are much increased, and the Phosphates are diminished.

Case 2.—Richard W—, æt. 40, King's Ward; brewer. Admitted April 24th, 1849, half-past 4, p.m.

He works in a brewery; and has had two, if not three,

attacks of delirium tremens. The last attack was four months ago. The last but one, six months before that. States that he drinks about two pints and a half of ale per day, but no spirits. The present attack began three days ago, with loss of sleep, excessive talking, and delirium. He has had no sleep since the attack began. On admission he was in a state of delirium, busy and incessantly chattering; his whole body was in a constant tremor; he would not be still for an instant, but was otherwise perfectly obedient when spoken to. The face was rather pale, and he had no headache.

He was ordered Senna immediately. Tr. Opii, ℥xx; Mist. Camphoræ, ℥jss, 4^{tis} horis. Porter, one pint.

25th. Has had a sleepless night, talking so constantly that he kept the other patients awake. He has been exhausting himself all the morning, in efforts to disengage his feet from the straps in which they are fastened. Pulse 108, soft and compressible, occasionally intermitting. Tongue moist, covered with a yellowish creamy fur, very tremulous. He is bathed in a profuse perspiration; says he has no headache and no appetite. Since his admission to the present time, he has taken only a few mouthfuls of meat and a pint of porter. In his medicine he has taken about two drachms of laudanum. Urine passed early this morning, not very scanty. Specific gravity = 1037·8. Gave with heat and acid a slight coagulum of albumen; with cold nitric acid an immediate crystallisation of nitrate of urea. Quickly deposited crystals of triple phosphate in small quantity.

518·9 grains boiled with Chloride of Barium, and dilute Nitric Acid, Sulphate of Baryta . . . . = 10·80 = 20·77 grs. per 1000 urine.

518·9 grains, with Hydrochloric Acid, and then Chloride of Calcium and Ammonia, Phosphate of Lime . . . . . = 1·15 = 2·14 „

Urine passed in the afternoon, 5 p.m., the same day. Acid to test-paper; gave a very large deposit of urate of ammonia; also a considerable deposit of albumen by heat and

acid; and an immediate precipitate of nitrate of urea. Specific gravity = 1041·2.

520·6 grains boiled with Chloride of Barium, and dilute Nitric Acid, Sulphate of Baryta	= 19·10	= 36·69 grs. per 1000 urine.	
520·6 grains, precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime	= 3·10	= 5·95	„
1936·4 grains, precipitated by strong Acetic Acid after Urate of Ammonia was dissolved, Uric Acid	= 2·35	= 1·21	„

10 p.m. He became much more delirious, noisy, and intractable. The perspiration pouring in large quantity from all parts of his body. Sp. Genevæ, ℥ij.

26th, 1 p.m. No improvement. Pulse became weaker and more fluttering; brandy was given. At 5 p.m. he was sick; and soon after he died.

Examination April 27th, 1 p.m. There was a large number of vascular ramifications on the interior of the cranium. The arachnoid was rather opaque from subarachnoidean fluid in the meshes of the pia mater. The superficial veins of the hemispheres of the brain were much congested; the substance of the brain was more watery than natural, but firm, and the puncta vasculosa numerous. The ventricles were not dilated; the choroid plexuses were dark, and had two or three small cysts. There was a small spot of extravasated blood along the posterior margin of the cerebellum under the arachnoid, dipping down into the sulci, but not into the substance of the cerebellum. In the posterior fossa of the cranium, at the point corresponding to the extravasated blood, was a fossa large enough to admit the extremity of the finger, but not extending through the whole thickness of the bone.

The posterior part of the left lung was congested; there were adhesions of old standing at the lower part of the right lung, and near its apex a small cretaceous tubercle; both lungs were crepitant throughout. The heart was covered with fat; the cavities were rather large, and the

valves perfectly healthy. There was no fluid in the pericardium; there were a few spots of atheroma at the commencement of the aorta.

The right lobe of the liver was adherent to the diaphragm; the whole substance of the liver was greenish, and of a pasty consistence; the gall-bladder was much distended with bile; the spleen was exceedingly small and healthy; the kidneys were congested; the Malpighian tufts being full of blood; on the surface of both kidneys were several small cysts, but the structure was otherwise healthy.

The bladder had exceedingly thin walls. Throughout the body the blood was perfectly fluid.

	Sulphate of Baryta.		Specific gravity.	Total Phosphates.
In this case on the 5th day	20·77 grs.	per 1000 urine	1037·8	2·14.
„ „ 5th night	37·07	„	1041·2	5·95.
„ „ 6th, died.				

Some sulphate of magnesia had been taken on the day previous to that on which the water was examined, and, doubtless, this partly increased the sulphates to the enormous amount here stated. The urea was also in great excess whilst the phosphates were below the amount of health, though the specific gravity was unusually high.

Case 3.—Robert B—, æt. 26, waiter, Fuller Ward. Admitted January 3d, 1850, at half-past 7 p.m. Always pale and sickly.[1] Was taken ill on the 23d of December, with sickness and loss of sleep. He had been poorly for a fortnight, so much so that soon after Christmas he gave up work: with rest and opiates he improved, and returned to his work for two or three days previous to his admission. In consequence of his excited state and his loss of sleep he came to the hospital. He was very violent until 11 p.m., when the strait-waistcoat

[1] This patient said that he was in the habit of drinking a quarter of a pint of gin, and three pints of beer daily. He had been in his situation for two years, and had taken more than his usual quantity at Christmas; that he never had any illness like this before. Had had rheumatic fever four years ago.

was put on. Sp. Æther Sulph. Comp., Sp. Ammoniæ Arom., āā 3j, Mist. Camph., ℥iss; sextis horis. Opii, gr. ij; Ext. Gentianæ, gr. xv, ft. suppositorium, statim. At 12 p.m., Tr. Opii, 3j statim.; 2 pints of porter and a mutton chop were ordered, after this he slept well until 4 a.m. Perspiring excessively on waking, he still talked much, but was not violent.

4th January, water passed at half-past 7 a.m. Thick from urate of ammonia. Deposit very pink coloured, filtered. Specific gravity = 1037·4. Acid.

518·7 grains boiled with Chloride of Barium, and dilute Nitric Acid, Sulphate of Baryta . . . . = 9·8 = 13·10 grs. per 1000 urine.
518·7 grains precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . = 5·10 = 9·83 „ „

Was much less excited during the day.

5th January, no more perspiration. Urine made before breakfast had the same appearance as yesterday; filtered. Specific gravity=1034·6.

517·3 grains boiled with Chloride of Barium, and Nitric Acid, Sulphate of Baryta . . . . = 6·70 = 12·95 grs. per 1000 urine.
517·3 grains precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . = 4·60 = 8·89 „ „

He got up to dinner, having no symptoms.

11th January. He went out without any return of the delirium.

	Sulphate of Baryta.		Specific gravity.	Total Phosphates.
In this case on the 13th day	13·10 grs.	per 1000 urine	1037·4	9·83.
„ „ 14th day	12·95	„	1034·6	8·89.
„ „ 20th, went out.				

Here also the sulphates are increased. The phosphates are also not diminished, probably, in consequence of the patient being able to eat. The amount of urea was not tested, but from the high specific gravity it is very probable that an excess of urea was present.

Case 4.—Thomas J—, æt. 34, broker. Admitted April 23d, 1850, York Ward. His wife states, that for eight years he has been in the habit of living chiefly on drink, taking but one meal daily. For some weeks past he has at times been slightly delirious; on the evening of the 21st, he was first seen, when he was very delirious, and had had no sleep for the previous forty-eight hours. Tr. Opii was given, first in drachm, and afterwards in two drachm doses, and by the following morning he had taken ten drachms of laudanum, and two grains of acetate of morphia. He was, at this time, very violent, having spectral illusions, a very rapid and feeble pulse, and tremors of the tongue and limbs.

He was induced to inhale chloroform. He became very rigid and somewhat convulsed before he was insensible; but he was quite insensible by the time forty minims had been inhaled; a little more chloroform was given occasionally to keep him asleep, two drachms being inhaled in all. He slept for about three quarters of an hour, and was quiet when he awoke, but not free from delusion. He took two drachms of tincture of opium in the course of the night of the 22d, and was a little better on the morning of the 23d. Pulse stronger and less frequent, but still he was sleepless, and six doses of opium in pills of three grains each were given in the course of the day, without any apparent effect. He inhaled a drachm of chloroform at seven p.m., and slept for about an hour; but, on being left by his medical man, his attendants let him get up and go out into the street, when he became unmanageable and was brought to the hospital. For this account I am indebted to Dr. Snow. On admission he was given Sp. Ætheris, c. ʒj, Liq. Antim. Tart., ʒij, Mist. Camph., ʒix, 4^{tis} horis.

24th April, 10 a.m. He has not slept more than twenty minutes during the night, and only five minutes at a time. He is very quiet. The pulse is rapid and feeble. Twelve ounces of urine were passed last night.—2 p.m. He has been sleeping for about an hour and a half, and is again disposed to sleep. Twenty-two ounces of urine were passed this morning; deep coloured, clear, acid. Specific gravity=1027·5.

513·75 grains boiled with Chloride of Barium, and dilute Nitric Acid,
Sulphate of Baryta . . . . =9·10 = 17·71 grs. per 1000 urine.

On the addition of nitric acid to this urine, an immediate crystallisation of nitrate of urea occurred.

The Antimony was omitted, and he was ordered ht. Morphiæ, ʒij, hac nocte.

25th. He slept nearly all yesterday afternoon, until about 9 o'clock p.m., waking at intervals of about an hour and a half. He slept very little during the night, and not above five minutes at a time.

2 p.m. He has taken a mutton chop and a pint of porter. Pulse 80, very full. He starts often in his sleep.

He passed about twelve ounces of urine, deep coloured, acid, contained an excess of urea, but did not give immediate crystallisation. Specific gravity = 1025·4.

512·7 grains boiled with Chloride of Barium, and dilute Nitric Acid,
Sulphate of Baryta . . . . = 6·40 = 12·48 grs. per 1000 urine.

Continue the medicine thrice daily, ht. Morphiæ, ʒiij, hac nocte.

April 26th. He slept four or five hours yesterday afternoon, but had no sleep during the night. He occasionally fancies he sees objects before him, otherwise he is very quiet. Ht. Morphiæ, ʒiij, hac nocte et rep. post horas tres.

27th. Slept four or five hours yesterday afternoon, but not more than two hours during the night. He has taken his chop and pint of porter each day. He is very quiet, but fancies he sees objects about him. Tr. Opii, ʒss, Mist. Camph. ʒiss, vesp. et post horas tres rep.

28th. Slept from 8 p.m. to 2 a.m. From this time he slept well, but for three weeks he required some opiate each night. He went out on the 21st of May, cured.

	Sulphate of Baryta.		Specific gravity.
In this case 6th day	17·71 grs. per 1000 urine	.	1027·5
" 7th day	12·48	„ .	1025·4
" 33d day, went out.			

The urea was in great excess when the sulphates were most in this urine also, and as the sulphates diminished less urea was found.

The amount of sulphates and of phosphates obtained in other cases of delirium tremens is stated in the table in the 'Philosophical Transactions;' but to give all the details of the cases would extend this paper without adding to its value. The four cases which I have selected are sufficient to show the striking increase of the sulphates in delirium tremens.

I pass on, then, thirdly, to the amount of sulphates and phosphates in acute inflammatory affections of the nervous structures.

The four following cases of acute or subacute inflammation of the brain will give the variations of the sulphates and phosphates in this class of cases.

Class III.

Case 1.—Philip B—, æt. 25, admitted November 24th, 1847.

On the 3d of November he was seen by the house surgeon, with a scalp wound, which had been made with a shovel on the left side of the head, near the vertex. There was great hæmorrhage, which was restrained by pressure, but he would not stay in the house.

On the 5th, he came with some fever, but without head symptoms, except pain, and from that time he followed his employment (he was a gentleman's servant) till the 21st of November, when he was attacked with severe headache and felt very ill. On the evening of the 23d, a severe rigor occurred, followed by much heat and sweating.

On admission on the 24th, his countenance was heavy; his articulation thick, and performed with some slight difficulty, and he could not walk unsupported. The right portio dura acted imperfectly; the tongue was somewhat drawn to the left side; the right arm numbed and almost powerless; he complained of slight headache. The pulse was 84, quick and regular. The tongue moist, and the skin cool. A scab about

two inches long remained from the wound, which appeared to have healed soundly, except in the centre, where a sinuous opening led down to exposed bone. A brisk purgative was immediately given, and repeated the 26th and 29th.

The day after his admission he was much better, and on the 29th all the symptoms had disappeared, excepting slight numbness of the arm. In the evening, however, he insisted on getting up, and it was some considerable time before he could be induced to go to bed; and the following morning there was a recurrence of all the symptoms of the 24th, with the superaddition of slight numbness of the right lower extremity, and pain in the left side of the head. But the pulse was still only 80, and the skin was cool.

December 1st. There was almost total paralysis of the right side.

2d. The paralysis is complete; the headache more severe; the countenance more dull and heavy; the articulation very thick and indistinct; and at half-past 1 p.m. he was trephined. The wound being enlarged crucially the pericranium was found to be readily separable from the bone, which, however, was only exposed in one spot. On the removal of a crown of bone by the trephine, some very fetid pus mixed with brain-like matter escaped, and two pieces more were therefore taken away by the instrument. The dura mater was then found to be separated for some distance, but healthy in appearance, except in one part, where there was a perforation, the size of the top of the thumb, round which it was sloughy. Out of this opening pus escaped from beneath the membrane. Perhaps, altogether, three ounces of matter were let out.

Water passed, before the operation, rather deep coloured. Gave a slight deposit of urate of ammonia and oxalate of lime. Specific gravity = 1018·7, acid reaction.

509·35 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 2·02 = 3·96 grs. per 1000 urine.

509·35 grains precipitated by Chloride of Calcium and Ammonia, Phosphate of Lime . . . . . = 2·62 = 5·14 „ „

10 p.m. The headache had left him. He felt inclined to sleep, and the pulse was 108 and soft.

3d. He had a quiet night. The pulse fell to 88. The tongue was rather cleaner. The countenance perhaps improved. The other symptoms the same as before the operation. Water passed about 2 p.m., all that he had passed since half-past 1 the day before. Deeper colour, much more loaded with urate of ammonia. Specific gravity = 1027·26.

513·63 grains boiled with Chloride of Barium, and Nitric Acid, Sulphate of Baryta . . . . . = 5·77 = 11·23 grs. per 1000 urine.
513·63 grains precipitated by Chloride of Calcium and Ammonia. Total Phosphates . . . . . = 5·72 = 11·13 „ „

4th. Water passed about 11 a.m., of much lighter colour. Gave no precipitate on standing. Acid to test-paper. Specific gravity = 1013·1.

506·55 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta. . . . . = 1·47 = 2·91 grs. per 1000 urine.
506·55 grains precipitated by Chloride of Calcium and Ammonia. Total Phosphates : . . . . . = 3·07 = 6·06 „ „

5th. He was lying in a state bordering on insensibility, and could scarcely speak. The eyes were half shut. The paralysed arm was contracted and stiff, and the thumb was drawn into the palm of the hand.

6th. Early this morning a rigor occurred. His motions were passed under him. The skin was warm and moist. The pulse 110, jerking. Tongue was furred. Pus was escaping freely from the wound. The dura mater was more sloughy, and the brain more prominent. It was stated that, during the afternoon, he became much less sensible, and that the jaws were so firmly fixed as to require some force to be used when it was necessary to open them.

Water passed at 11 a.m., gave a deposit of urate of ammonia and crystallised phosphate of lime, acid to test-paper. Specific gravity = 1027·0.

513·50 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 3·77 = 7·34 grs. per 1000 urine.
256·02 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 1·97 = 7·69 „ „
513·50 grains precipitated by Chloride of Calcium and Ammonia. Total Phosphates . . . . . = 5·52 = 10·75 „ „
513·30 grains precipitated by Chloride of Calcium and Ammonia. Total Phosphates . . . . . = 5·67 = 11·04 „ „

11 p.m. The face was noticed to be much swollen and red; and in this state he remained until between 3 and 4 a.m. on the 7th, when he died.

Post mortem examination 33½ hours after death: On removing the skull cap, no mischief was detected between the bone and the dura mater, but the exposed portion of dura mater presented a large opening through which the brain protruded; all the exposed portion was sloughy, and covered with lymph and most offensive discharge. On removing the dura mater, the convolutions of the brain appeared much flattened. On the right side, with this exception, there was nothing of any importance. On the left side there was a small, nearly circular, piece of the surface of the brain, which was prominent and sloughy, and which corresponded to the opening in the dura mater; through this latter projecting portion there was an opening leading into the substance of the brain, and communicating with a large foul abscess, which occupied a large space towards the posterior portion of the hemisphere, and extended to the upper wall of the left ventricle, into the cavity of which it had very nearly perforated. The walls of the abscess were perfectly distinct and firm. The substance of the brain surrounding the abscess was of a light lemon colour, and soft and pulpy in consistence. The greater portion of the left hemisphere not implicated in the abscess, was in this inflamed and altered condition, and on the outer side, where the mischief extended to the grey substance, the latter was entirely changed in character,

and had the same appearance as the other inflamed parts. The lateral ventricles were distended with thin serum. The septum lucidum was much softened and very readily lacerated. The base of the skull was natural.

There was some partial and firm adhesions of the pleura on both sides, chiefly at the upper part. Both cavities contained a quantity of blood mixed with serum. The upper portion of the lungs was crepitant, but the lower parts were highly congested and much compressed. The right lung was much collapsed when the chest was opened. There did not appear any injury of either lung. The other viscera were healthy.

The variations of the sulphates and phosphates may be thus given.

	Sulphate of Baryta.		Specific gravity.	Total Phosphates.	Urine.
12th day,	3·96 grs. per 1000 urine.	.	1018·7	5·14 grs. per	1000
13th day,	11·23	„	1027·3	11·13	„
14th day,	2·91	„	1013·1	6·06	„
16th day,	7·34 7·69	„	1027·0	10·75 11·04	„ „
16th night, died					

The inflammation was not of the most intense character; but the increase of the sulphates and phosphates is apparent, and the corresponding variations of the two salts is very distinct.

Case 2.—Emma F—, æt. 11, Crayle Ward. The mother says the child was strong, healthy, and very quick; has two more children quite healthy. Admitted March 22d, 1848. Has had pain at the top of the head for fourteen days, for which the head has been shaved; had some disease of the scalp; the mother states that she fell down stairs yesterday, since which she has been much worse. The tongue is furred; the pulse 130, sharp; the bowels open; the pupils large, but acting; she answers questions very readily; is unable to stand; the head is thrown back; there is no strabismus: fever diet.

Hirudines xij temporibus, Cal., gr. iij, statim, ht. sennæ, ℥jss, post horas tres. Hydr. Chlor., gr. ij, pulv. Opii, gr. ¼, ter die. Ht. Nitri; ℥jss, 6^{tis} horis. Glacies capiti.

23d. Skin hot and dry; pulse 108, small and rather sharp;

face swollen, looks heavy, and is very drowsy; motions greenish and lumpy; distinct pulsation in the carotids; has not been sick; water thick, scanty, and contains no albumen; that passed last night alkaline when I got it; a drop or two of hydrochloric acid was added, filtered. Specific gravity = 1030·0.

515·0 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 4·55 = 8·83 grs. per 1000 urine.

515·0 grains precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . = 4·85 = 9·41 „

Rep. Calomel, 6^tis horis. Rep. ht. Sennæ. Pint of milk.

24th. Water scanty; mouth rather sore; pupils dilated; still very drowsy and heavy; tongue rather brown. Rep. Pil. c. Opii, gr. $\frac{1}{6}$, vice $\frac{1}{4}$. Enema commune statim. P. c. glacie.

In the afternoon the opium was omitted. P. c. Hydr. Chlor., gr. ij, 6^tis horis. Emp. Lyttæ Nuchæ; Ung. Hydr. Ulceri. All the water that was passed from the previous night to 1 p.m. was about a pint, secreted after senna and salts had been taken; on long standing, it gave an excessive deposit of urate of ammonia. Acid. Specific gravity = 1029·0.

514·50 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 5·50 = 10·69 grs. per 1000 urine.

514·50 grains precipitated pink by Chloride of Calcium and Ammonia. Total Phosphates . . . = 4·35 = 8·45 „

25th. Pulse 115, sharp and hard; pupils large and sluggish; breathing hurried; complains of pain in the chest. P. c. Pil. ter die.

26th. Mouth sore; takes more notice; bowels not open. P.

27th. The nurse says that she was delirious last night; complains of a good deal of pain in the head; pulse quick, skin hot. Ol. Ricini, ℥ss, statim; Pc. Pil. bis in die.

28th. Skin dry; pupils rather smaller; sees double; head not so much thrown back; bowels well open by the oil, and motions very copious; urine scanty. Rep. Oleum. P. c. ht.; Rep. Emp. Lyttæ, and Ung. Hydrarg.

29th. Pulse only 84; bowels freely open; sees double.

30th. Face more flushed; head more thrown back; pupils more dilated; pulse 84; seems to suffer most acute pain; complains chiefly of her back; bowels have not acted; water scanty, contains no albumen; acid. Specific gravity = 1029·8.

514·90 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 4·55 = 8·83 grs. per 1000 urine.

514·90 grains, precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . = 5·25 = 10·19 „

Infri. Ung. Hydrarg. omni nocte. P. c. ht. 4^{tis} horis. Enema commune hac vespere.

31st. Head still thrown back; is quite insensible; does not appear to see at all. Water passed under her. Insensibility came on last evening. Face flushed; pulse 60.

Pul. Jalap. c. 3j, statim. P. c. unguento. Adde haustui Tr. Lyttæ ♏x. Water to be drawn off.

1st. Much better; sees perfectly; bowels were open four or five times, but the motions were passed under her; water much more plentiful, 18 ounces drawn off this morning; is quite sensible, and complains of a great deal of pain in the head; pupils not nearly so dilated, but frequently changing; pulse 80; head still thrown back; passed a very restless night. Rep. omnia.

2d. Quite insensible; takes no notice of anything; face flushed; squints very much, and the face is at times convulsed; is very restless, and calls out occasionally; pulse 86, very small; bowels have operated once, and a good deal of water has been passed under her; the skin is hot and dry; pupils are dilated, and she is evidently much lower.

3d. Still insensible; perspiring very freely; pupils very dilated, and squinting; not so much urine passed as yesterday; bowels not open; pulse 100; there is some difficulty in swallowing; water drawn off to-day, acid; contained some albumen, blood and pus globules. Specific gravity = 1031·4.

515·70 grains boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 4·85 = 9·40 grs. per 1000 urine.

515·70 grains precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . = 4·65 = 9·01 „

4th. Rather more sensible; pulse 150 running; lies perfectly quiet; skin perspiring; makes but little water; bowels not open; is sinking. Emp. Lyttæ amplum nuchæ. Pul. Jalap. c. statim. Vini Rubri, ʒij.

5th. Died at 5 o'clock this morning. Examined thirty-two hours after.

The body was well formed and rather thin. The vessels of the dura mater were gorged with blood. The convolutions of the brain were much flattened. The superficial vessels were much distended, and the subarachnoid cellular tissue on the superior surface of the brain contained a small quantity of very slightly opaque serum. The substance of the brain presented very many puncta of blood, and the cortical structure was dark in appearance. The lateral ventricles were distended with serum, which contained some flocculi of lymph, making it slightly turbid. The septum was softer than natural, and jelly like, but not tattered. In the subarachnoid cellular tissue at the base of the brain, there was a much larger quantity of semi-transparent lymph effused. The structure of the cerebellum was somewhat softer than the cerebrum, but this might have resulted since death.

In the upper part of the right lung, there was a small patch of scrofulous matter, with the deposit of several small miliary tubercles in its neighbourhood; other small semi-transparent tubercles were found thinly scattered over the other portions of the lung. In the left lung there were also a few miliary tubercles; the lower lobe was inflamed and hepatised at its lower part, and greatly congested. The heart was healthy. The kidneys were healthy in structure, but the mucous membrane of the pelvis was slightly congested in both. The mucous membrane of the bladder was congested, perhaps slightly inflamed.

In this case.	Sulphate of Baryta.	Specific Gravity.	Total Phosphates.
15th day	8·83 grs. per 1000 urine	1030·0	9·41
16th „	10·69 „	1029·0	8·45
22d „	8·83 „	1029·8	10·19
26th „	9·46 „	1031·4	9·01

28th, died.

In this case also, the corresponding increase of the sulphates and phosphates is remarkable, considering the age of the patient. The post-mortem examination leaves no doubt whatever as to the nature of the disease.

Case 8.—Henry P—, æt. 23, York Ward, accustomed to drink freely. Admitted May 16, 1849; having been an out-patient for hæmoptysis. Complains of pains all over the body and limbs, with constant tremor, which he has had for ten days; sleeps badly; no appetite; feels very weak; is covered with profuse perspiration; tongue rough, has been much furred; pulse feeble; has occasional attacks of dyspnœa; bowels rather confined; has much headache; petechiæ over the body. Milk diet and beef tea. Salines, blue pill, and castor oil.

17th. He says he has attacks of shivering four or five times a day, afterwards he perspires; bowels have been open this morning; pulse 72, soft; slept well last night.

18th. He is in a constant perspiration; skin hot; hands trembling; slept well last night; tongue coated and moist; no headache; starts up from his sleep frequently in the night; he is occasionally slightly delirious, and says that he sometimes fancies two persons are walking along the ward when there is only one.

19th. Feels extremely weak; tongue tremulous, moist, and creamy, furred at the base; he perspires less than he did; pulse 72, soft, intermitting; he sleeps in short, light dosings, very frequently both day and night; still occasionally he is slightly delirious; bowels not open; no appetite; urine very dark.

20th. Has been very delirious and noisy all night, having no sleep. To-day he has a dull, heavy, vacant look; he answers questions, but not readily; he does what he is told to do; left eyelid closed; pupils neither dilated nor contracted; no strabismus; face not flushed; complains of great pain across the forehead; tongue is protruded towards the left side; the left arm is paralysed, lying by his side; so also appears to be the left leg; the right arm is in constant tremor, and

moved about unsteadily without any apparent object; urine passed early this morning, deep coloured, alkaline. Specific gravity=1031·6.

515·8 grs. boiled with Chloride of Barium and dilute Nitric acid, Sulphate of Baryta . . . . . .= 5·10 = 9·88 grs. per 1000 urine.
515·8 grs. precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . .= 4·40 = 8·72 „ „

Late at night about 32 ounces were drawn off; acid; contained phosphate of lime crystals. Very deep coloured, contained some few blood globules, probably from the catheter. Specific gravity 1032·2. On the 22d, torulæ were very evident, but no trace of sugar could be found.

516·1 grs. boiled with Chloride of Barium and dilute Nitric acid, Sulphate of Baryta . . . . . .= 5·20 = 10·07 grs. per 1000 urine.
516·1 grs. precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . .= 4·60 = 8·91 „ „

Enema commune statim; Emp. Lytt. nuchæ, Radatur caput; Glacies capiti. Calomel gr. ij; Opii gr. ¼ 6^tis horis; ht. Nitri, ʒiss, 6^tis horis.

21st. Rather less pain across the forehead. He was very noisy and delirious all yesterday and last night; he is now quiet, speaking only occasionally; still answers questions, but with less readiness; still does some things which he is told to do; paralysis of the left side of the body the same as yesterday; he speaks with the right side of the mouth (as also he did yesterday); the right hand still moves about and is in constant tremor; the eyes are both turned towards the right side; tongue rather red at the tip, furred at the base; skin hot and dry; no contraction or dilatation of the pupils; eyes bloodshot and suffused; pulse variable, 11 a.m., 84; 1 p.m., 144, soft; bowels were open yesterday after the injection, not to-day. On examination of the chest, want of breathing was found at the apex of the right lung. Twenty-four ounces of urine were drawn off early this morning, acid, specific gravity=1016·4, contained more blood-globules.

508·2 grs. boiled with Chloride of Barium and dilute Nitric acid, Sulphate of Baryta . . . . . = 3·40 = 6·69 grs. per 1000 urine.
508·2 grs. precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . = 2·40 = 4·74 „ „

Later in the evening about 18 ounces of urine were drawn off, acid. Specific gravity = 1018·2.

509·1 grs. boiled with Chloride of Barium and dilute Nitric acid, Sulphate of Baryta . . . . . = 4·20 = 8·25 grs. per 1000 urine.
509·1 grs. precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . . = 2·90 = 5·69 „ „

Enema commune statim P. c. Pil., 4^{tis} horis, c. Pulv. Opii, gr. $\frac{1}{2}$. At 9, when the urine was drawn off, he became comatose; pupils dilated.

22d. He continued comatose throughout the night, and died at $\frac{1}{4}$ before 11 a.m.

Examined May 23d, 1 p.m.

The dura mater was very vascular, and the Pacchionian glands larger than natural. The arachnoid was slightly opaque, and the superficial veins enormously distended. The substance of the brain was tolerably firm; not wet; very vascular. The lateral ventricles were dilated with clear fluid. At the base of the brain in the posterior subarachnoidean space there were slight traces of opacity, apparently from lymph. Two or three small tubercles were found in the cineritious substance of the posterior part of the right lobe of the cerebellum.

Both lungs were adherent to the parietes of the thorax. There was cretaceous deposit in the bronchial glands. The lungs were crepitant, but congested; at the posterior part of the left, was a large patch of pulmonary apoplexy; in both there were a few tubercles, particularly in the apex of the left. Heart quite healthy, containing no coagulum.

Liver healthy for the greater part. At the upper part of the right lobe was a large cyst, with a dense wall, containing thick, whitish, cheesy-looking matter, also some gelatinous substance.

Both kidneys were congested, smooth on the surface; a few tubercles were found in each.

Bladder was much distended with urine. We have, then, on the—

	Sulphate of Baryta.	Specific Gravity.	Total Phosphates.
15th day	9·88 grs. per 1000 urine	1031·6	8·72
„ night	10·07 „	1032·2	8·91
16th day	6·69 „	1016·4	4·72
„ night	8·25 „	1018·2	5·69

17th day, died. The increase of the sulphates and phosphates is not so marked as in the previous case; but the specific gravity being considered, it is evidently present.

Case IV.—George M—, æt. 22, under-butler, York Ward. Admitted October 16, 1848. The man who came with him said that he was taken ill on the 13th with pain in the head. On the 14th he was worse, and had leeches applied to the head; on the 15th he became delirious, and the next day was sent to the hospital. Mr. Keate made inquiry for me, and the history of this man's illness appeared to be true. He had had no cough previous to the headache, and had been out with the carriage one day before it began.

Water passed on the evening of the 16th; scarcely acid to test-paper. On standing twenty-four hours, contained some granules and tufts of phosphate of lime, and some phosphate of ammonia and magnesia. It was clear when passed. Specific gravity = 1027·85, neutral.

514·20 grains, boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . = 4·30 = 8·55 grs. per 1000 urine.

514·20 grains, precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . = 3·70 = 7·19 „

2000 grains of urine with Hydrochloric Acid, Uric Acid . . = 2·95 = 1·47 „

Ht. Potasse Citr. 6^{tis} horis; ht. Rhei mane.

Oct. 17. Is very delirious; face flushed; tongue moist and furred; conjunctivæ suffused; head hot; pulse 100; skin hot and dry. Hirudines viij, temporibus.

P. c. ht. c. Vini Ant. Pot. Tart., mxl; Cal., gr. iv, hac nocte. Emp. Canth. ampl.

18th. Has been very delirious all night; constantly talking; lies on his back; passes his stools and his water in bed; pulse 96; face still much flushed, and head hot. Urine drawn off this evening. Specific gravity = 1026·1; gave a deposit of phosphate of ammonia and magnesia in twenty-four hours; about half a pint, neutral.

513·20 grains, boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 4·01 = 7·81 grs. per 1000 urine.
513·20 grains, precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . = 3·30 = 6·43 „
2054·2 grains, with Hydrochloric Acid; Uric Acid . . . . = 1·55 = 0·75 „

C. Cruent. temporibus ad. ℥viij; Perst. Vespere Calomel gr. iij, hac nocte, et post horas iv.

19th. Face less flushed, and skin less hot; low muttering, with convulsive movements of the hands; eyelids nearly closed; pupils insensible, not dilated, or but slightly so; bowels open; pulse 96. The catheter could not be introduced, but the water was passed freely under him.

Enema commune statim. Calomel, gr. viij vespere.

20th. Lies quite still, and moans sometimes; face pale, cooler, with a slight perspiration; eyelids more open; eyes fixed; pupils insensible; slight strabismus; skin hot; pulse 140, sharp; tongue cooled; and much occasional hiccough. Water drawn off at 2 p.m., 16 ℥, quickly gave a deposit of urate of ammonia, highly acid, and remained so on the 25th. Specific gravity = 1031·4.

515·70 grains, boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . . = 6·00 = 11·63 grs. per 1000 urine.
515·70 grains, precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . . = 4·80 = 9·30 „
2062·40 grains, with Hydrochloric Acid. Uric Acid . . . . = 1·65 = 0·80 „

Rep. Enema vespere Glacies Capiti subinde. Hyd. c. cretâ, grs. v, 6^{tis} horis.

21st. Gradually sinking; urine drawn off late; very thick from urate of ammonia, filtered. Specific gravity = 1026·2. Twenty-six ounces of urine.

513·10 grains, boiled with Chloride of Barium and Nitric Acid, Sulphate of Baryta . . . . = 5·20=10·13 grs. per 1000 urine.

513·10 grains, precipitated by Chloride of Calcium and Ammonia. Total phosphates . . . = 4·10= 7·99 „

He died in the night.

Examined 27 hours after. Body in good condition.

The vessels of the dura mater were congested, and the large veins of the pia mater; there were about the usual number of puncta vasculosa; no increased depth in the colour of the grey matter; there was a slight amount of sub-arachnoid fluid on the convex surface of the hemispheres; no effusion of lymph or pus anywhere; the lateral ventricles contained a small quantity of serous fluid, which was perhaps a little turbid; the septum lucidum and fornix were but little, if at all, softened; the blood-vessels ramifying in the superficial structure of one of the thalami optici had undergone a peculiar alteration, which appeared to consist in the deposit of an opaque white matter in their coats; the matter consisted of oily molecules, sometimes very distinct, and resembled, on the whole, some varieties of scrofulous deposit; the large vessels at the base were not observed to have undergone any morbid change; the substance of the brain was everywhere healthy, so far as the eye could judge, but very wet.

The left pleura was healthy; there were some old adhesions on the right side; both lungs contained numerous miliary tubercles, which were most advanced towards the apex of the left lung; there was no vomica; the left lung, at its posterior part, was excessively congested, so much so that a piece of it sank in water; it did not, however, seem to be truly hepatised; the right lung was similarly affected to a much less

degree; the pericardium contained an ounce of serous fluid; the heart was healthy; the aorta healthy, and its coats not stained; liver healthy; kidneys contained numerous small tubercles, but were otherwise healthy; spleen rather enlarged.

The deposit in the blood-vessels of the brain appears to have been similar to that found by Dr. Hughes Bennett in cases of inflammation of the brain.

We have, then, in this case:—

	Sulphate of Baryta.	Specific Gravity.	Total Phosphates.
4th day	... 8·55 grs. per 1000 urine	... 1027·8	... 7·10
6th „	... 7·81 „ „	... 1026·1	... 6·43
8th „	... 11·63 „ „	... 1031·4	... 9·30
9th „	... 10·13 „ „	... 1026·2	... 7·99

9th night, died.

There is, therefore, a very decided increase in the sulphates and phosphates, and the corresponding increase and diminution of the two salts is again apparent.

The four cases, though not so marked as those which I have recorded in my previous paper in the 'Medico-Chirurgical Transactions' for 1847, are confirmatory of the statements made, that in inflammation of the brain the phosphates are increased. From these cases it is probable that the sulphates are also increased in the same disease.

Conclusion.

These, then, are the most remarkable examples which have occurred to me, of the increase of the sulphates in disease.

The phenomenon common to acute chorea and to intense delirium tremens, is increased and unceasing muscular action; the result of which is, an increase of the sulphates and of the urea in the urine; just as in health they would be increased if continued exercise was taken.

In my former paper I stated, that in delirium tremens, when no food was taken, the phosphates were diminished; and I attributed this to the diminished action of oxygen on the nervous structure. How far I was correct in my conclusion, further experiments must determine; but as in this

paper I have shown that the phosphates were diminished in acute chorea, when no food could be taken, it must be admitted, that abstinence from food in itself lessens the phosphates, more than from my former experiments appeared to be the case. Still, however great the abstinence from food in chorea may be, the amount of phosphates in that disease, or in any other, was never found to be so low as in the cases of delirium tremens, recorded in my previous paper.

Cases of excess of urea in the urine possess some interest, in consequence of the opinion of Dr. Prout, that the excretion of an excess of urea, constituted a disease analogous to diabetes. The cases I have now detailed, of excess of urea in chorea and delirium tremens, point to the fact, that the increase is a consequence of the changes taking place in the muscles, and that the amount of urea does not constitute the disease, but is a result of the changes which are taking place within. The muscles are highly complex organic compounds, in which sulphur exists in an unoxidised state; and the muscular action is accompanied, if not caused, by an action of oxygen, which, among other results, gives rise to the formation of urea and sulphuric acid, the amount of oxidation being proportioned to the intensity of the muscular action.

In my former paper, I also stated, that in cases of increased action of the brain, an increased formation of phosphoric acid results from an increased oxidising action taking place in the nervous structures. The cases which I have now related, of the variation of the sulphates and phosphates confirm the fact, that in inflammation of the brain, the phosphates are considerably increased, and they lead to the belief that in the same cases, the sulphates also are above the average amount. When it is remembered that the amount of sulphur in the albumen of the brain, is probably not very different from the amount of phosphorus in the cerebral fatty matter, the simultaneous and corresponding increase of the phosphates and sulphates in inflammation of the brain, is seen to depend on the same oxidising action which takes place at one time, on all the elements of the

nervous structure, at another time, on all the elements of the muscular structure, according as an increased action of the brain or of the muscles takes place.

I cannot quit this subject without again repeating, that these experiments are preliminary; they show the action of the inspired oxygen within the human body, in a few striking cases. They are slight demonstrations of the far more extensive results which may be obtained, by taking into the account the quantity of phosphates and sulphates which are thrown out of the kidneys in twenty-four hours. But in such experiments, unless the greatest care is taken in determining the exact quantity of urine secreted in twenty-four hours precisely, the results will lead to error, and not to truth.

ACCOUNT OF A CASE IN WHICH

A LARGE CYST CONTAINING HYDATIDS

WAS DEVELOPED AT

THE ROOT OF THE NECK,

DEATH ENSUING FROM RUPTURE OF THE LEFT SUBCLAVIAN ARTERY.

BY

JAMES DIXON,

SURGEON TO THE ROYAL LONDON OPHTHALMIC HOSPITAL,
AND ASSISTANT-SURGEON TO ST. THOMAS'S HOSPITAL.

Received May 6th.—Read June 24th, 1851.

THE following case presents so many points for consideration, in respect of the origin of the disease, its course, and unexpected result, as to render it, I believe, worthy of being brought under the notice of practical surgeons.

Henry Moore, a waterman, æt. 24, of healthy appearance, and free from any signs of scrofula, was admitted into St. Thomas's Hospital, January 14, 1851.

Nine years ago he first noticed a small, fixed lump, about the size of a pigeon's egg, rising just above the level of the left clavicle, at the outer side of the sterno-mastoid muscle. It felt firm to the touch, was painless when pressed upon, and the skin covering it was of natural appearance. It grew very slowly; and the only inconvenience the patient felt was an occasional numbness and tingling in the left arm and hand.

About a year ago he noticed that his left hand, which, in consequence of his employment, was often in the water, became more readily chilled than the right, and then remained numb for a considerable time. This led him frequently to examine the hand; and in doing so, he discovered that there was sometimes no pulse to be felt at the left wrist; and

about six months since pulsation ceased there entirely. About this period he gave up his employment as bargeman, as the exertion of using the pole brought on pain and numbness throughout the left arm.

When he came to the hospital, the tumour presented the following appearances:—Its bulk, as far as it could be defined, was about that of a hen's egg; it seemed to rise up from about the situation of the first rib, behind the left sterno-mastoid muscle and carotid sheath, having pushed these parts forwards and towards the right side, and the external jugular vein slightly backwards. Above the middle part of the clavicle the swelling was but slightly prominent, being bound down by the cervical fascia: the omo-hyoideus muscle could here be felt running obliquely across it. The most prominent part was on the median plane, about an inch above the top of the sternum: at this spot the displaced left common carotid artery could be seen pulsating, and it communicated a harsh thrilling impulse to the finger. Parallel to the artery, and between it and the inner edge of the sterno-mastoid muscle, lay a large vein, which might be made to swell up considerably by pressing just above the top of the sternum. The pomum Adami lay rather higher than natural, and the notch in the thyroid cartilage was more than half an inch to the right of the median plane. In no part of the tumour itself was any aneurismal pulsation, or bellows-sound, discoverable; the thrill felt above the sternum being due to the carotid artery, thrust forwards by the growth behind it; and the impulse communicated to the mass became more and more feeble as the finger was removed from the neighbourhood of this vessel. The only spot where anything like the elasticity of fluid could be detected was an inch above the left sterno-clavicular articulation, where the sterno-mastoid muscle and large anterior jugular vein, diverging from each other, seemed to leave the tumour covered only by skin and fascia.

The patient's voice was hoarse and weak, and had been so for about three months before his admission. He had no difficulty in swallowing, and the effort caused no movement

in the tumour. Not the slightest pulsation could be traced in the left arm, not even in the axillary artery; but the return of blood through the vein seemed free, as there was no œdema of the limb.

The position of the tumour, then, as far as it could be explored, was evidently behind the left carotid sheath; and it seemed probable that it had closed the subclavian artery by compressing that vessel against the first rib. With respect to the nature of the tumour, the diagnosis appeared to lie between encephaloid deposit, and a cyst containing fluid; its slow progress making the latter supposition the more probable one.

After much careful examination, it was decided that an exploratory opening should be made, and on the 25th of January a fine trochar was passed directly backwards, an inch above the left sterno-clavicular articulation, between the inner edge of the sterno-mastoid muscle and the large vein running beside it. About one drachm of clear, colourless fluid escaped, and pressure over the swelling failed to bring out any larger quantity. For several days after this puncture had been made, the harsh thrill in the left common carotid artery almost ceased; and it was thought by some who carefully examined the patient, that a very feeble pulsation could be detected in the left radial artery.

In consequence of the prevalence of erysipelas in the ward, no further operation was attempted until the 8th of March. The patient's general health meantime continued good, and he felt no inconvenience, except occasionally some obscure pain in the neck, and slight numbness in the left upper extremity. The operation was necessarily slow, in consequence of the important parts in the immediate neighbourhood of the incision, and the uncertainty existing as to the position in which some of them might be found. The incision was commenced about an inch above the left sterno-clavicular articulation, and carried upwards along the inner edge of the sterno-mastoid muscle to the extent of an inch and a half. The large vein, which afterwards proved to be an unusually developed anterior jugular, bulged into the wound so much

that, to avoid it, it was thought best to shift the position of the wound by drawing the skin a little outwards, so as to bring the incision nearly over the interval between the sternal and the clavicular portion of the sterno-mastoid muscle. The fibres of the latter having been carefully divided, part of the sterno-thyroid muscle was seen, having been brought a little out of its natural position by the pressure of the tumour. As soon as the fibres of this muscle had been separated to the same extent as those of the preceding one, a fascia-like structure was exposed, which felt elastic to the finger, as if containing fluid. A fine trochar was passed in, and a few drops of clear, colourless fluid escaped, similar in character to that which had been previously found. The knife was carried along the canula, and the fascia-like structure divided to the extent of more than half an inch. Immediately a thin membrane presented, which, on being drawn out, proved to be an empty hydatid, about the size of a marble. Another hydatid bulged into the opening, and (the nature of the swelling being thus ascertained) I passed in my finger, and found a large sac so filled with hydatids of various sizes that I could not ascertain its precise extent. I brought several of the largest cysts, some of them as large as a hen's egg, against the edge of the first rib, and broke them one after another; afterwards withdrawing the empty skins as they presented themselves at the wound. Carrying the knife upon my finger into the opening I had made into the sac, I enlarged it, directly upwards, to the extent of two or three lines, and was then able to pass my forefinger behind the sternum and along the edge of the first rib, but could not reach the bottom of the sac, where several hydatids could be felt crowded together.

In making this last incision some slight arterial bleeding occurred, apparently from some muscular branch of the sterno-mastoid in the upper angle of the wound. Pressure with the finger and thumb arrested this, and a compress and bandage were applied over the spot, to prevent its recurrence.

The patient complained much of pain during the operation, and became faint and exhausted; but as his circulation resumed its activity, the pulsation of his left radial artery became almost as distinct as that of the right.

He passed a pretty good night, and felt easy the next morning.

March 9th.—The sac still containing a large quantity of broken and entire hydatids, and blood having also escaped into its cavity, presented almost as large a swelling as before the operation. The pulse at the left wrist was rather less than it had been overnight.

On the 10th the compress was removed from the wound, and, as no farther bleeding had occurred, a poultice was applied.

11th.—Two whole hydatids, the size of pigeons' eggs, and several smaller ones, passed out of the wound to-day, together with many fragments of larger ones which had been broken at the time of the operation. An offensive sanies begins to drain away from the wound.

13th.—Two more entire hydatids, similar to those passed on the 11th, several others the size of peas, and fragments of broken ones, came away. The patient feels easy. The discharge from the wound is more copious, and, although very fetid, has more of the appearance of healthy pus.

15th.—I passed my finger this morning through the wound, so as just to enter the opening in the sac. The patient was directed to lie as much as possible in such a position as to favour the escape of the discharge.

17th.—The pus from the wound is very fetid. My little finger, passed into the sac, does not come in contact with any hydatid, but enters an empty space. No hydatids have passed out for the last four days. The patient's appetite begins to flag, and he feels low, but does not complain of much pain. He was ordered to take Liq. Cinchonæ, ℿxx, twice a day, and a pint of porter with his dinner.

19th.—One entire hydatid, as large as a hen's egg, passed this morning, and three burst ones about half that size. The patient feels better again, and his appetite has improved.

20th.—Two large hydatids passed to-day. The opening in the sac begins to contract, so that it only admits the tip of the little finger. Fetid sanies continues to drain away.

Nothing worthy of note in the patient's condition occurred till the—

27th (the nineteenth day after the operation), when I was sent for, at 10 a.m., in consequence of bleeding having occurred from the wound. One of the dressers happened to be near at hand when word was brought him that the patient was bleeding. A large clot had slowly forced its way out of the wound, followed by a jet of blood. Pressure was applied over the wound, and when I arrived all hæmorrhage had ceased, and only a little colourless fluid, like that from a hydatid, welled up now and then from the opening. The patient was much blanched; the sac was distended, evidently with clot; pulsation could be felt at the left wrist, but feebler than at the right. A little strip of whitish tissue, like dead cellular membrane, hung in the wound. I ordered the patient to be constantly watched, and a bladder of ice to be laid on the part.

1 p.m.—An empty hydatid (when full, the size of a hen's egg,) came away an hour ago, and no blood passed then or since; the patient described a peculiar sense of oppression—"a burden" he termed it—about the left side of the sternum, as having preceded this morning's burst of hæmorrhage. He was ordered to omit the porter, and to allay his thirst by sucking, now and then, a bit of ice.

28th.—I was sent for again at 4 a.m. A fresh burst of bleeding had taken place, and had been checked by pressure, as before. At the same time a strip of fibrous tissue, about five inches long by two in width, like sloughy fascia, passed out of the wound. This made it appear probable that the whole sac was in a state of slough, and was loosening from the surrounding textures, and that the bleeding was taking place from the various vessels destroyed in the process.

When I arrived at the bedside all bleeding had ceased. The patient was so faint that I gave him two ounces of wine. The dresser continued to watch beside him, ready to apply pressure on the first sign of clot in the wound.

9 a.m.—No more hæmorrhage. At 5 p.m. I was again summoned. A fresh jet had occurred, instantly stopped by the dresser in attendance. With but slender prospect of success, I now determined to explore just so far as to ascertain whether the blood came from any partially divided vessel at the mouth of the sac, and consequently within reach. I extended the skin-wound two inches upwards, along the sterno-mastoid muscle, and made a cut an inch long outwards from the lower end of the wound, and then cut carefully through all the clavicular portion of the sterno-mastoid muscle. The central tendon of the omo-hyoideus was thus exposed and divided, and a clear view obtained of the mouth of the wound in the sac; and along its outer edge lay a very large vein (the internal jugular). It was quite collapsed, and it was only by running the finger over it that a little blood could be made to pass along it, and its being a vein demonstrated. No aperture could be found in its wall, nor could any cut vessel be discovered.

From time to time, during this exploration, masses of broken-down and putrid clot were jerked out from the sac with great force, together with much bloody sanies, but no fresh blood flowed. Any attempt to enlarge the opening in the sac seemed out of the question; a compress was therefore laid over the wound, and a bladder of ice applied.

The patient died the following day, at 10 a.m.

29th.—Body examined four hours after death. The chest alone could be inspected. The first bone of the sternum, the left clavicle, together with the five lower cervical and three upper dorsal vertebræ, and the first two ribs on both sides, the larynx, œsophagus, aorta, and upper half of the left lung, were removed for subsequent examination. A few ounces of serum were in the cavity of the left pleura, stained by the transudation of colouring matter from the clot in the sac. There was a patch of quite recent fibrin on the outer side of the middle lobe of the left lung, and three or four slender bands of this deposit were attached to the costal pleura adjoining. There were no signs of old pleuritis anywhere, and the lung was crepitant throughout.

The larynx, trachea, and bronchi having been removed from the preparation, it required great care to dissect away the œsophagus without opening the inner wall of the hydatid sac, so closely were the two structures united. The portion of the vertebral column removed from the body, consisting of the five lower cervical and three upper dorsal vertebræ, presented a considerable curvature, the concavity being toward the left side. The sac, formed of condensed cellular tissue, was attached above to the left side of the third cervical vertebra, and thence along the median plane of the vertebral column, as far down as the lower part of the body of the second dorsal vertebra; from the latter point it passed on to the convexity of the aortic arch.

On dividing the vertebral attachment of the sac, so as to obtain a view of its interior, the fifth, sixth, and seventh cervical vertebræ were found to have undergone absorption to the extent of almost the left half of their bodies; and the corresponding portions of the second dorsal vertebra had suffered in nearly the same degree. The head and neck of the first and second ribs had likewise disappeared. The vertebral vessels were exposed at one or two points of their course through the foramina in the transverse cervical processes, and the cancellated texture of these processes laid bare, like that of the bodies of the vertebræ.

From the left side of the second dorsal vertebra the sac was traced, as above noticed, on to the convexity of the arch of the aorta; but, by careful dissection, it might be separated from the coat of this vessel as far as the outer side of the origin of the left subclavian artery. At this point, however, the sac and aorta became united by delicate vessels, and this union extended for a distance of nearly two inches onward along the arch.

The sac next came in contact with the apex of the left lung, to which it was intimately united, by fibrinous adhesion, to the extent of the palm of one's hand; no intervening layer of pleura being distinguishable. Loosely attached to the inner surface of the second rib and border of the first, the sac passed on to the internal surface of the scaleni

muscles, and so back to the transverse processes of the four lowermost cervical vertebræ, from which situation we began to trace it.

Superficial to the anterior surface of the sac ran the left common carotid artery, accompanied, when above the level of the sternum, by a very large *anterior* jugular vein, which, from its great size and relative position to the artery, had, during the patient's lifetime, been supposed to be the internal jugular. The last-mentioned vein, however, had been widely separated from the carotid artery by the pressure of the swelling, and lay to the outer side of the incision made into the sac; the carotid artery and vagus nerve skirting the inner edge of the same opening.

The scaleni muscles were found in their natural position, and the subclavian artery emerged from between them in the usual way; it seemed, however, rather smaller than natural, and, on drawing it out a little from between the muscles, it had evidently undergone constriction in that situation.

The dissection having been pursued to the extent above described, without interfering with the wound, to prevent the possibility of injuring any vessel in the neighbourhood, the interior of the sac was examined from behind, by drawing forward that portion which had been detached from the vertebræ. When cleared of the broken-down and putrid clots which filled it,[1] it presented a surface of sloughy shreds of membrane, except at the back part, where the bony structure of the vertebræ was laid bare. It was probably from this situation that the long strip of fibrous tissue had been detached, which passed out of the wound on the occasion of the burst of hæmorrhage.

The source of this hæmorrhage was now discovered. At the bottom of the sac the left subclavian artery lay exposed to the extent of nearly an inch, and exhibited a slit, about half an inch long, through which a probe passed directly into the aorta. The latter having been laid open along the concavity of its arch, the probe was seen lying in the entrance of the subclavian artery. This vessel was next

[1] A solitary, collapsed, hydatid was found within the sac.

slit up along its outer side, from its origin almost to the point where it passed between the scaleni. Its cellular coat was so thickened, and so identified with the condensed pleura, that it was impossible to trace the bounds of each. The inner coat of the artery was everywhere entire, except at one spot, distant about three quarters of an inch from its aortic origin, where its inner wall presented a shallow oval depression, half an inch in width, the long axis parallel to the course of the artery. Along half of the circumference of this oval depression the coats of the artery had given way, so as to establish the communication above described between its cavity and that of the sac.

Although externally to the scaleni the calibre of the artery was free, and its size scarcely, if at all, less than natural, a probe could not be passed downwards to the seat of rupture; and the cause of this was now apparent. The long-continued compression of the artery between the sac of hydatids and the edge of the first rib had terminated in total obliteration of the vessel at the latter point, so that for a distance of more than half an inch it was merely a rounded cord. The vertebral and internal mammary arteries took their usual course (the latter being, perhaps, larger than natural); the thyroid axis was given off in the usual way; and about three-quarters of an inch farther on, the subclavian, having narrowed to a tube less than half a line in diameter, became entirely closed. As this closure must have been of old standing, the circulation in the left arm had probably been carried on by the anastomosis existing between the supra-scapular and subscapular arteries; but, considering the *total* absence of pulsation at the wrist for so long a time previous to the sac being opened, it is difficult to account for so distinct a pulsation having been restored immediately after the operation.

With regard to the manner in which the rupture of the subclavian artery occurred, one would rather have expected to find evidence of ulceration of its outer coat, at the point where it was laid bare by the separation of the sloughy portion of the sac, than at the corresponding spot within the

cavity of the vessel. Indeed, my first impression, on viewing the rent in its wall, was, that it had been wounded during the operation, more especially as some arterial bleeding had taken place towards its conclusion. A little examination, however, proved that this accident could not have happened. When my finger was first introduced into the opening I had made in the sac, its cavity was entirely choked up with hydatids; and it was not until several of these had been broken, in the manner above described, that the point of my finger could be brought fairly in contact with the edge of the first rib. The only enlargement of the original wound in the sac was made, as I have stated, directly upwards, in a line with the angle of the jaw, and by means of a small scalpel introduced on my finger. If we notice, on the preparation,[1] the distance between the opening in the sac and the rent in the subclavian artery, the possibility of a wound of the latter appears altogether out of the question; nor should I have alluded to it at all, but for the circumstance of arterial bleeding taking place when the opening in the sac was enlarged.

That the artery was not injured subsequently to the operation is certain; for no probe or similar instrument was ever passed into the wound, its patency being, as I thought, best ensured by passing the point of my finger into it from time to time.

The bleeding, too, which followed the last small incision was arrested by pressure, maintained for about an hour with the finger and thumb, at the mouth of the wound, and for some hours afterwards with a pad of lint. During eighteen days, broken or entire hydatids were passing out; and it was not until the nineteenth day after the operation that the fatal hæmorrhage commenced.

With the knowledge we now possess of the extent to which the disease had proceeded, there can, I think, be no doubt that the operation hastened the patient's death, by the free admission of air into the sac, and the consequent

[1] The preparation was exhibited to the Society; it is preserved in the Museum of St. Thomas's Hospital.

sloughing of its walls; but with the uncertainty which necessarily existed as to the real nature of the case, it would have been wrong to have abandoned it without an operation of some kind being attempted. Here was a cyst, containing fluid, steadily increasing in bulk, which had entirely stopped the current of blood through the subclavian artery, and was gradually impeding that through the common carotid, as well as the return of blood through the veins of the neck. The pressure on the nerves supplying the left arm had already obliged the patient to abandon his employment, and the alteration in his voice seemed to indicate an amount of pressure on the trachea, which might ultimately end in suffocation.

It seems impossible to determine with certainty the structure in which the hydatids were first developed; but if we regard the rounded pits seen here and there on the eroded surface of the vertebræ, it seems not unlikely that they may have been the original seat of the parasites, which, as they grew, would of course press on the nerves passing down to form the brachial plexus, and thus cause the tingling and numbness of the left arm and hand, which were the earliest symptoms noticed by the patient. The sheath of the left longus colli muscle, and the anterior ligaments of the cervical vertebræ, probably formed the sac at an earlier stage of the disease; condensed cellular tissue, and, ultimately, the pleura covering the apex of the left lung, together with fibrinous deposit, completed it at a later period. The pressure which had latterly been exercised upon the superior and inferior laryngeal nerves on the affected side, had, doubtless, caused the peculiar weak and hoarse tone of the patient's voice.

Microscopical examination of most of the hydatids was made as soon as they were voided. In several, of the size of pigeons' eggs, clusters of echinococcus were found, in various stages of development; but neither in the largest cyst, which was equal in bulk to a hen's egg, nor in those about the size of a pea, could any of these bodies be detected.

A CASE OF
ANEURISMAL DILATATION
OF
THE POSTERIOR TIBIAL VEIN,
COMMUNICATING INDIRECTLY WITH
THE UPPER PART OF THE POPLITEAL ARTERY.

BY

EDWARD COCK,

SURGEON TO GUY'S HOSPITAL.

Received May 7th.—Read May 27th, 1851.

THE obscurity which involved this case during its progress, the remarkable and, I believe, unique character of disease which it exhibited, when at length its true character became developed, and the difficulty of explaining some of the circumstances connected with it, have induced me to lay it before the Fellows of the Medical and Chirurgical Society.

George Mortimer, æt. 28, a tide-waiter, was admitted into Guy's Hospital under my care on the 30th of October, 1850, for a painful and swollen state of the left leg.

He was married, had always enjoyed good health, and had led a steady, temperate, and active life. His statement was as follows: between three and four months ago, while stationed at Gravesend, he was attacked by fever, which confined him to his bed for a considerable period and left him in a very debilitated state. He was then removed to Carshalton for the benefit of his health; and about five weeks ago, when endeavouring for the first time to walk about, he discovered that his leg was stiff, painful, and swollen. These symptoms gradually increased until he was admitted into the Hospital.

On examining the limb (October 30) as he lay in bed, I found general enlargement and œdema from the knee down to the toes. The cellular effusion was greatest about the ankle and instep. The principal enlargement was at the back of the leg, where the calf was bulged out into a prominence, extending from the knee to rather more than halfway down, tense and tender. Deep-seated fluctuation was very distinct, and it was evident that a large collection of fluid existed under the gastrocnemii muscles. He had been the subject, during the last few weeks, of occasional rigors with exacerbations of pain and fever; and there was every reason to suppose that a large collection of pus had formed between the superficial and deep-seated muscles. While engaged in making the examination, my attention was accidently directed to a large cicatrix on his thigh; and I then learnt that his femoral artery had been tied eleven years previously by Mr. Tracey of Dartmouth, for a supposed wound of the popliteal artery inflicted by a stab with a knife. The operation had been performed two weeks after the injury, on the occurrence of secondary hæmorrhage, and had been perfectly successful. He speedily recovered the full use of his leg, and never experienced the slightest inconvenience; neither has he ever been aware of the existence at any time of any tumour or swelling. He however has subsequently informed me, that two years after the artery had been tied he became the subject of varicose veins on the same leg; that he had recourse to bandages, which he wore between three and four years and then left them off. The veins had by that time somewhat diminished in size, but had acquired a permanent enlargement and thickening of their coats, which has since continued.

The history which I have just related induced me to make a second careful examination of the limb.

The femoral artery could be felt pulsating along the upper part of the thigh. The anterior and posterior tibial arteries could be felt to beat vigorously, after displacing the superjacent œdema by pressure; not the slightest sense of pulsation, not the faintest sound or murmur could be detected

in the tumour at the calf; it was totally uninfluenced by arresting the flow of blood through the artery at the groin; and I still considered it to be a large abscess.

The suffering condition of the patient required that some relief should be afforded; and accordingly, on October 30th, an incision was made into the cavity near the upper and inner part of the leg, where the walls appeared to be thinnest. A flow of blood followed the withdrawal of the lancet, until between two and three ounces had been spontaneously discharged through the opening. The blood was dark, grumous, and pitchy in its character, did *not* coagulate, and had evidently been extravasated for a considerable period. Its evacuation sensibly diminished the tension of the swelling, and the pain was relieved. A piece of lint was laid over the part; the limb was placed on a pillow, and strict quietude enjoined.

On November 1st he was again complaining of a good deal of pain in the leg, accompanied by fever and restlessness. A small quantity of pus had oozed through the wound, which was nearly blocked up by a clot of blood. On removing this with a pair of forceps a copious discharge of pus took place, and in a few minutes nearly a pint had flowed away. The fluid was offensive in its character, and contained numerous half-decomposed softened-down coagula of blood. Fomentations were applied over the leg and a generous diet ordered.

It was now quite evident, that at any rate the larger part of the swelling had consisted of an extensive accumulation of matter beneath the gastrocnemii muscles; and the free discharge which now took place was accompanied by a marked improvement in the symptoms, both locally and generally.

I need not trouble the Society with the details of the case during the next ten days, as they are those incident to a large deep-seated abscess; a large quantity of pus, partially mixed with blood, had been evacuated, and the patient had began to rally in health and strength.

Nearly a fortnight had now elapsed since the leg was first punctured. The extravasated and decomposed blood had been entirely got rid of. The discharge of pus from

the now contracted and diminished cavity, was small in quantity and healthy in character. The leg had returned to nearly its natural size and shape; the man's health was daily improving.

During this period I had frequently turned the case over in my mind, endeavouring to account for the effusion of so considerable a quantity of blood and the formation of so large an abscess; canvassing the possibility of a connection between the recent circumstances and the former wound of the popliteal artery. My speculations on the subject could now be but of little importance. The solution of the mystery was nearer than I anticipated.

On November the 14th, just fifteen days after the puncture had been made, when the state of the patient promised a speedy convalescence, arterial hæmorrhage suddenly took place from the wound, and before competent assistance could be afforded he had lost nearly three pints of blood. The flow was arrested by a firm compress placed over the wound, and by pressure on the artery at the groin, which, however, he could only bear in a modified degree. On my arrival I found the entire cavity of the original abscess tense and distended to more than its original size, whilst its walls had evidently given way, and blood was gradually effusing itself upwards through the popliteal space into the thigh. The entire leg had a swollen, shiny, and livid appearance. There could be no doubt that arterial hæmorrhage was going on, and that the remedial means must be prompt and decisive.

Three methods of treatment suggested themselves, which I respectively considered and discussed with Mr. Poland, the only one of my colleagues whose assistance was available at the time. The first was to place a ligature on the upper femoral or external iliac artery; the second was to lay open the cavity of the leg, evacuate its contents, search for the vessel which afforded the hæmorrhage and if possible secure it; the third was to amputate above the knee.

We came to the conclusion that a ligature on the upper femoral or iliac artery would probably throw us on to the horns of a dilemma; that, from the free collateral circulation

resulting from the former operation, it might at best afford but a temporary check to the bleeding; whilst on the other hand, if the supply of blood to the leg became materially diminished in its then present state, gangrene would follow as an almost inevitable result. This proposition was therefore abandoned. The second shared the same fate, as we considered that the operation of laying open the cavity and searching for the vessel was, as regarded the collapsed state of the patient, too severe in its character; and, considering our ignorance of the source of hæmorrhage, too uncertain in its results to be attempted. Our last resource was amputation; and I removed the leg a short distance above the knee.

The remaining history of the patient may be dismissed in a few words. He rallied slowly from the prostration produced by the loss of blood and from the shock of the operation; but in a month's time the stump was nearly healed and I considered him as convalescent. He then became the subject of low fever accompanied by bronchial irritation and general constitutional irritability. His appetite failed, and he began to exhibit all the symptoms which had preceded several cases of fatal phlebitis, a disease which was at that time epidemic in our hospital. I determined to remove him before it was too late; and finding that he had a comfortable home at Carshalton despatched him thither without delay. The change acted most beneficially. In a week's time his unfavorable symptoms had all disappeared, he rapidly recovered, and is now filling the situation of gate keeper at the Custom House.

The amputated leg was most carefully dissected by Mr. Poland who has kindly furnished me with the following account of his examination:—

The limb œdematous and much increased in size. A small lancet wound on the inner side of the calf, giving exit to puriform fluid and decomposed blood with clots. Close by, thinning of the integuments, which appeared just on the point of giving way by ulceration. On removing the integuments, all the superficial veins were found much enlarged,

and their coats exceedingly thickened, but the vessels themselves were quite pervious. A track of subcutaneous suppuration extended from near the knee to the ankle, the pus of pinkish colour mixed with some clots of blood. The gastrocnemius muscle expanded and very thin, as was also the soleus, which was exceedingly stretched and distended. On reflexing these muscles, a large diffused collection of blood in part coagulated was found beneath, extending from the knee to half-way down the leg. On washing away this blood, an aneurismal sac about the size of a duck's egg was brought into view. It was situated beneath the upper part of the soleus muscle, and had displaced the posterior tibial nerve, which curved round and was stretched over its outer border. The sac had given way by an ulcerated opening at the upper part near the entrance of a vessel. The vessels, both arteries and veins, were carefully dissected out and presented the following appearances:—

In the centre of the popliteal space, lying on the posterior ligament of the knee, was a small and firm sac about the size of a pigeon's egg: its walls, in part, cartilaginous with ossific deposit; within a cavity lined by fibrin, and empty. Leading to the sac from above were two vessels, viz. the popliteal artery and vein. The artery was somewhat smaller than normal but otherwise healthy and pervious, and freely entered the sac. The vein tapered down and was lost on the walls of the sac as a fibrous cord; above, its coats were much thickened and filled with firm old coagulated blood. From the lower part of the sac issued two vessels, both freely communicating with its interior. The smaller one was the efferent continuation of the popliteal artery much diminished in size, which, after passing down as usual to the leg, divided into the anterior and posterior tibial and peroneal branches. These vessels were quite pervious and natural, and, although small in size, evidently constituted the normal arterial distribution to the leg. The larger vessel descending from the sac, proved to be the continuation of the popliteal vein; it was greatly thickened, pouched, and puckered, but quite pervious, and passed down to the lower border of the pop-

liteus muscle where it divided into two trunks. The one of these, which was completely filled and obliterated by old firmly coagulated fibrin, accompanied the anterior tibial artery. The other, which formed the continuation of the original trunk, was pervious, and led directly into the interior of the aneurismal sac, with the walls of which its coats became identified. Again, from the lower part of the sac there emerged three or four large branches which were impervious, with thickened walls and solid fibrinous contents. These accompanied the posterior tibial and peroneal arteries. That all these vessels were veins notwithstanding the arterial character and thickness of their coats, and that they constituted, in fact, the venæ comites to the arteries of the leg, was distinctly made out by the dissection, and furthermore by washing out their contents and discovering their valves. They were all completely obliterated along the whole of their course; and the blood must have been returned from the leg entirely through the agency of the superficial veins.

The several facts connected with this case which were brought to light by the dissection, may be shortly enumerated as follows:—

1st. That the popliteal vein and artery had both been wounded by the original injury eleven years ago, and that a permanent communication had become established between the two vessels, maintained through the intervention of a small sac common to both.

2dly. That the popliteal vein above the seat of injury had become obliterated and was obstructed up to the line of amputation. That it probably regained its permeability at its junction with the saphæna minor vein, which vessel appeared to have returned the greater part of the blood from the leg.

3dly. That the popliteal vein below the seat of injury had become dilated and thickened, apparently from the impulse of the blood received into it from the artery, and that it terminated below in an aneurismal dilatation of the posterior tibial vein, while all the venæ comites of the leg had become completely obstructed and obliterated.

4thly. That at some subsequent period the walls of the venous aneurismal dilatation must have given away, allowing the extravasation of a certain amount of blood beneath the gastrocnemii muscles.

5thly. That in consequence of or at any rate connected with this extravasation of blood, was the occurrence of an abscess, which finally, after the lapse of eleven years, again brought the patient under surgical treatment.

Thus it will appear that the history of this case extended over a period of eleven years; the original wound and the final abcess constituting the commencement and termination.

The chronological order in which the other intermediate changes and events occurred, necessarily becomes a subject for conjecture and discussion. We possess no precise clue to guide us as to the succession observed by the obliteration of the popliteal vein above the original wound; the dilatation and formation of the venous aneurismal sac below, the obliteration of the venæ comites of the leg, and lastly the escape of blood from the sac beneath the muscles. Consequently it is by no means clear how far these events were dependent on each other.

It will, however, be remembered that the superficial veins of the leg became dilated and thickened about two years after the femoral artery had been tied; and this may, in some measure, serve to fix the period when the obstruction of the venæ comites took place.

The subject presents a wide field for inductive reasoning and ingenious speculation, but I have forborne to add to the length of my communication by stating more than was necessary to lay before the Society a simple recital of facts.

I subjoin a communication which Mr. Tracey has been kind enough to send me, relative to the details of the original injury.

"I saw Mortimer within an hour of the event, October 30, 1889, and found a small wound in the popliteal space from which blood was oozing slowly; a small thread of arterial blood being distinctly visible over the darker venous blood, which constituted by far the greater part of the hæmorrhage.

As the blood did not issue per saltum, my impression was that only a small artery had been wounded, and that the popliteal had escaped, more especially as I found that moderate pressure of the thumb over the wound commanded all bleeding.

The lad was sent to bed, strict rest was enjoined, and a firm compress was placed over the wound secured by a bandage.

Before leaving the house, I was shown a dinner knife, old and well worn at the back towards the end, so that, although originally round, it had become tapering at the extremity. On comparing the length of the wound with the breadth of the blade, I found that the knife must have penetrated deeply, but still could not reconcile such slight hæmorrhage with the wound of an important artery.

Every thing went on well for the first day or two, the bleeding was completely restrained, and there was no complaint but from the tightness of the bandage. About the third day a spot of dark coloured blood appeared through the compress. This was removed and more carefully applied, and the bandage carried higher up the thigh so as to make firm pressure on the femoral artery below the groin. Things again went on well up to the eighth or ninth day, so that I began to entertain hopes that nothing more would be necessary, when the spot again made its appearance. On examining the wound, no union had taken place, but, with the exception of a little puffiness, it looked healthy. The same treatment was continued till the 12th of November (twelve days after the accident), and I doubt whether during that time a tablespoonful of blood had been lost. On that day (viz. the 12th) I found the edges of the wound everted and the colour of the surrounding skin slightly livid. On making moderate pressure with my finger, a small sized coagulum slipt out, and a moderate flow of clear blood followed. I determined to take the bull by the horns, and accordingly tied the femoral artery, the ligature around which instantly stopped the hæmorrhage.

From this period everything went on most satisfactorily. On the fifth day union throughout the line of operation had

taken place, except immediately about the ligature, which came away on the twelfth day, by which time also the wound in the popliteal space had firmly united. The lad perfectly recovered and returned to his work, and for some two or three years afterwards felt no inconvenience, as I used to see him constantly. He then left the town, and I heard no more of him until you again brought him to my recollection."

DESCRIPTION OF THE PLATE.

A. Small Aneurismal Sac resulting from the original wound of the popliteal artery and vein, communicating with the artery above and below, and with the vein below.

B. Popliteal Artery entering the sac from above.

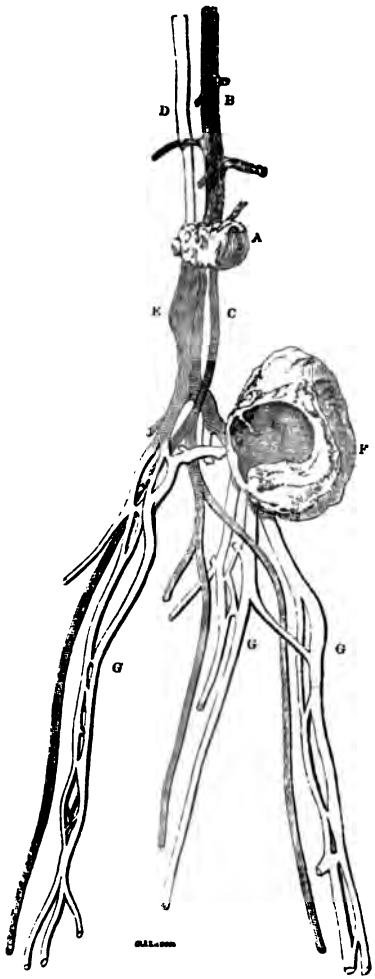
C. Popliteal Artery leaving the sac below, and proceeding to its normal distribution in the leg.

D. Upper portion of the Popliteal Vein obliterated and attached as a cord to the sac.

E. Lower portion of the Popliteal Vein dilated and thickened, leaving the sac and carrying arterial blood, and terminating below in an aneurismal dilatation of the posterior tibial vein.

F. Aneurismal dilatation of the posterior tibial vein.

G. Venæ Comites of the leg, anterior and posterior tibial, and peroneal, obliterated.


D
B
A
K
C
F
G
G
G

ON A
NEW METHOD OF TREATMENT
APPLICABLE TO
CERTAIN CASES OF EPIPHORA.

BY

WILLIAM BOWMAN, F.R.S.

PROFESSOR OF PHYSIOLOGY AND OF GENERAL AND MORBID ANATOMY IN KING'S COLLEGE, ASSISTANT-SURGEON TO THE KING'S COLLEGE HOSPITAL, AND TO THE ROYAL LONDON OPHTHALMIC HOSPITAL.

Received May 13th.—Read June 24th, 1851.

THE most common cause of obstruction to the flow of the tears into the nose, is inflammatory thickening of the mucous lining of the excretory channels, with accumulation of morbid secretions in the sac. But there are other causes, affecting only the puncta or canaliculi, yet equally preventing the escape of the tears, and therefore quite as annoying and as detrimental to sight. It is to certain examples of this latter kind, that the present brief communication refers.

Among these may be mentioned, *displacements* OUTWARDS *of the puncta*, generally the lower one, so that the tears no longer reach the orifice, and of course cannot enter the canal; and *closure of the puncta or canaliculi*, following mechanical injury or ulceration.

Of the displacements of the puncta, a common one is that which attends ectropion, in which the mucous membrane of the lid is thickened and often cuticular, and the tarsal margin, including that part surmounted by the punctum, becomes rounded and flattened, and the punctum thrown out of the course of the tears. The mucous lining of the

canal and sac here often participates in the inflammatory thickening.

The treatment of this displacement may sometimes resolve itself wholly into that of the ectropion, and the punctum, when restored, as far as possible, to its proper direction, may, in a great measure, resume its function. And I have remarked, that in some instances of old standing ectropion, although the punctum continues displaced, yet the *stillicidium lacrymarum* gradually subsides, apparently in consequence of the diminishing sensibility of the mucous membrane as an excitant of the lacrymal secretion, under its long exposure to the air, and slow approach towards the characters of skin. Indeed, it is singular how little these patients sometimes suffer from the obstruction, except when the secretion is augmented by a cold wind, or other accidental cause.

In other cases it will happen, that after the ectropion is cured by one of the various operations in common use, the epiphora remains,—the punctum either continuing a little displaced, or at least surrounded by tumid tissue, and irreparably altered in structure. If it should appear that the sac is itself healthy, the mode of treatment presently to be described will then be applicable.

But there is another and a much simpler displacement of the punctum than that which accompanies ectropion, and which, as far as regards the arrest of the tears on the front of the eye, is even more incommodious to vision, inasmuch as the lid itself, retaining nearly its natural position, holds up the tears upon the front of the cornea, where they occasion false refractions of the light, which are not common in the epiphora of ectropion. Moreover, the secretion of tears seems to be maintained at its usual rate, and is not diminished as it often is in chronic ectropion.

A close examination is necessary to detect the cause of the epiphora in these instances. The lid is either in natural contact with the globe, or only slightly recedes from it in certain positions, as when the eye is turned upwards. The natural prominence on which the punctum is placed, is

however, wanting, and, instead of it, there is a flattened or rounded cutaneous surface, on which the orifice may be discerned (though with difficulty) at a little distance from the mucous surface of the lid, and much reduced in size, being in fact never wetted by the tears, but dry and contracted.

When the situation of the orifice is discovered, a probe may be easily introduced into the sac, which is itself empty, proving the integrity of the apparatus, except as regards the position of the punctum.

There appear to be at least two causes of this displacement of the punctum: one, a slight chronic inflammation of that part of the conjunctiva lying near the punctum, producing thickening and consequent eversion—(this may exist alone or in connection with any of the chronic ophthalmiæ, especially those of the lid),—the other, a chronic affection of the skin of the lower lid, somewhat resembling eczema, by which a general but moderate contraction of it is produced, and the punctum is drawn outwards.

It is a remarkable fact, that an extremely slight displacement outwards, will destroy the function of the lower punctum, and the following considerations are offered in explanation of it. The puncta are naturally so placed, as to be either altogether on the conjunctival aspect of the lid (as in some of the lower animals), or else (as in man) at the very margin at which the skin and conjunctiva blend. Now skin differs from mucous membrane, in the superficial layers of the cuticle being rendered greasy by the sebaceous secretion, so that they throw off water as greased paper does; whereas, the corresponding part of mucous membrane is moist, and water adheres to it. To apply this to the eyelids, and their relation to the passage of the lacrymal fluid:—the tears have to be directed towards the puncta, and to enter these orifices; and if the skin were not greasy up to the margin of the lids, the tears would be very apt, indeed would be certain, to ooze over the tarsal margin on to the cheek. The skin of the lids is, however, exceedingly delicate and thin, and deficient in sebaceous follicles. But to supply this want, there is a great development of sebaceous

glands, placed so as to pour their secretion on the margin of the lid, close upon the line of junction of the skin with the mucous membrane—on that part where there must be a constant tendency for the moisture of the mucous membrane to soak through and wet the surface of the cuticle, and yet where it is so essential to the retention of the tears, that the skin should be greasy. So that I regard the meibomian glands as existing, not for the purpose, as stated in anatomical works, of preventing the agglutination of the lids when closed, (which would be no more likely to happen here, without sebaceous matter, than it is to occur between the lips of the orifice of the urethra,) but for the purpose of maintaining that greasy state of the surface of the cuticle at the margin of the lid, which prevents the tears from escaping over the cheek. And I may add, that the probable use of that sebaceous gland, called the caruncle, is to throw the tears into a little pool above it, where they may be taken up by the puncta; for even the lower punctum glides above the caruncle in the winking movements of the lids. Now it appears, that the punctum, though situated on the confines of skin and mucous membrane, partakes only of the character of the latter. Its margin is always naturally moistened by the tears, and is not greasy. The mucous surface on its inner side, over which the tears approach it, is also moist and conjunctival. Now in the cases to which attention has been called, the punctum has its margin greasy and cuticular, as a consequence of its displacement and exposure, and the membrane on its inner side is similarly changed, so that the tears are prevented from coming up to it, and do not wet it, but collect in a drop at the caruncle. And if the punctum is pushed back into contact with the tears, its margin instantly throws off the moisture, and cannot be wetted by it. In some cases, a margin of $\frac{1}{50}$th of an inch of greasy membrane on the conjunctival side of the punctum, is sufficient to destroy its function.

I had seen instances of epiphora depending on the structural changes now adverted to, which resisted all treatment short of operation, and in which no operative procedure like

those in common use—such as removal of a portion of mucous membrane—seemed to promise a good result, when the following case presented itself:—

A woman, æt. 43, came to be relieved of chronic ophthalmia in the left eye. The upper lid was a little deformed between the punctum and sac, owing to its having, as she said, been injured when she was eight years old. On examination, the canal was found to have been torn completely across, yet the orifices to have remained open, so that a probe introduced through the punctum, emerged near the caruncle, and could be reintroduced at the lower orifice (which was of ample size), and carried forwards into the sac. No epiphora existed.

A second case, much resembling this, occurring some time afterwards, led me to reflect whether a somewhat similar division of the lacrymal canal might not be artificially made with advantage in some inveterate examples of epiphora, so as to remedy all the inconveniences of the affection, by giving the tears a new way into the sac; for these instances seemed to show, that such an orifice in the canaliculus would not be disposed to contract, as it might have been expected to do from the analogy of other mucous ducts, while it would probably serve as well as the original punctum to convey the tears. This idea was tested in the following manner:

A young man, engaged in a warehouse in the city, had suffered for two years, from constant watering of the eyes. The skin of the lower lids seemed to have been affected with chronic eczema—it was red, shining, and contracted. The lower lids at the inner canthus were a little separated from the globe, so that the puncta had not their proper backward direction, but appeared flattened and slightly everted. The tears, collecting at the inner canthus, did not touch the puncta. The upper puncta were similarly flattened, and were small and indistinct. A probe passed readily through all the puncta into the sacs.

14th Feb., 1850. Introducing a probe into the left lower punctum, I cut transversely upon it, midway between the punctum and caruncle, on the conjunctival aspect, and

brought out the probe at the wound. I then slit up the canal a little way towards, but not quite up to, the punctum. This wound of course did not completely cut across the canal. It was made where the tears collected, and I hoped that it would remain open and allow them to enter the canal. But though I kept it open by separating the edges daily, and afterwards by passing a thread through the punctum into the canal, and bringing it out at the new opening, the tendency to close was so great, that on removing the thread ten days after, the wound immediately healed, and the operation proved unavailing. While the thread had remained, however, he had experienced great relief, and the tears had hardly accumulated.

On March 9th, the canal was pervious to a probe from the punctum to the sac, without obstruction. Despairing of keeping open an orifice thus made in the side of the duct, I determined to attempt the same object in another way, viz., by slitting up the canal from the punctum, for a length sufficient to carry backwards the orifice on to that part of the mucous surface, where the tears collected. This I did with a scalpel, by the aid of a punctum probe introduced as a guide. On the following day, the section being adherent in its whole extent, I broke through the adhesions with a probe, and repeated the same process a few times, so as to prevent union of the margins, while the wound was healing. On the 20th, the canal was converted into a groove, and the edges showed no further disposition to adhere. The tears found their way from this groove along the remaining part of the canal into the sac, and the epiphora was almost entirely relieved. I was therefore encouraged to perform the same operation on the opposite lower lid, and was pleased to see it followed by the same satisfactory result. In July, the parts remained in exactly the same state. The epiphora was quite removed. He could pursue his employment with comfort. I have recently seen him, and found the cure satisfactory.

The experience afforded by this case, led me to reject the plan of dividing the canal transversely, as first suggested by

the cases of accidental injury, and to adopt the more simple expedient of slitting it up for a short distance from the punctum, on the conjunctival aspect.

In thus destroying the punctum, I was not without some misgivings whether the tears would be taken up by the new orifice thus artificially made, at a part of the canal unprovided with the same structural arrangements which it is usual to attribute to the puncta. These fears were unfounded, for the tears entered the canal perfectly at the intermediate point. This result renders it probable, that too much importance has been given to the punctum by writers on the lacrymal apparatus, and perhaps also to that three-sided channel which is said to be formed between the margins of the lids and the globe of the eye, when the lids are closed, and which is supposed to be useful in directing the tears towards the puncta. In the sheep, the orifices of the puncta are obliquely placed on the flat, or slightly rounded, margin of the lids, and the shape of the meibomian margin does not admit of the formation of any such triangular groove as that now alluded to. In the human subject, also, I believe it will be found, on close examination, that the edges of the lids are not so bevilled as to form a triangular groove by their apposition in front of the globe. When the lids are closed, they touch each other by the posterior or meibomian, and not by the ciliary, lip of their margin. Indeed, the position occupied by the meibomian orifices would prevent this supposed channel from playing the part usually assigned to it.

It is interesting to notice the difference in the tendency to contract manifested by the new orifice, according as it is made by a total transverse, or by a partial longitudinal division. In both cases, the divided tissues of the wall probably undergo the same kind, and most likely the same degree of contraction; but when the division is transverse, a slight contraction in the circular direction will close the canal; whereas, when it is longitudinal or oblique, a corresponding amount of contraction of the divided margin of the wall cannot close, or even much constrict, the entrance to the canal, because the wall is only divided along one side of its circumference, and the rest is left uninjured.

In fact, the analogy of the urethra guided me in this respect, where, in the able hands of my friend Mr. Fergusson, I had seen a longitudinal division of the canal from the orifice which remains after amputation of the penis, obviate that most troublesome of the results of this operation, the tendency to a stricture at the point cut across. Both canals are allied in structure and function, as ducts of glands, and both possess in their walls that muscular element which seems the seat of the slow contraction, following division, to which allusion is now made.

Of course I should not advise this operation to be performed in *recent* cases of displaced puncta, nor in any in which other and milder treatment seemed available. It is well to remark, however, that no visible deformity results from it, and that no one would be aware it had been performed without an accurate examination of the part.

The following is another instance in which it has been at once successful in relieving a long-standing case of most annoying epiphora.

A clerk to a shipping-agent, æt. 57, caught slight cold in the right eye two years and a half ago, and since then the tears have always run over the cheek, especially when exposed to the cold air; at times the eye has been inflamed in a trifling degree. He has been annoyed with having to use the handkerchief constantly through the day, and his sight has been much troubled by the continual suffusion of the eye with tears.

I found the sac and lacrymal apparatus quite healthy, except that the border of the lower lid, in its inner half, was rounded and slightly flattened, so as not to fit accurately to the globe. The punctum, instead of being at the summit of the usual angular projection, lay forward on a flat surface, and was hardly visible. The skin around it was dry and cuticular, and the tears never reached it, but accumulated about the caruncle and along the margin of the lid. I passed a probe with ease through the punctum into the sac; there was no obstruction.

I slit up the canal for one eighth of an inch, on a probe, and along the mucous aspect. Two days after he came to

have the margins of the slit separated. They were adherent and filled up by lymph, which I broke through. He had experienced no relief as yet. Two days afterwards I found the slit permanently established, its margins healed, and the orifice carried backwards on the conjunctival surface for one eighth of an inch to near the caruncle. He was greatly relieved. He had been out much in the air in the prevailing east wind the previous day, and the eye had scarcely watered at all. In the last two days the eye had been better than for two years and a half. Since this I have frequently seen him, but no further interference has been required. He seems entirely cured.

At the commencement of this communication I alluded to cases of epiphora, depending not on displaced but on *obstructed* puncta or canals. Such cases do occur every now and then, either by simple contraction or stricture of the canal, or from ulceration or accidental injury. It is remarkable that the tears do not always accumulate in these cases, either from the remaining punctum doing double duty, or from the ordinary secretion of tears being scanty. My friend Dr. Budd sent me a patient suffering from the secondary effects of concussion of the eyeball. I found, besides, that the lower canal had been divided about the middle, and that it was completely obstructed at the seat of the cicatrix. There was no stillicidium. But, in general, such a condition is attended with weeping; and in some of these cases, a modification of the operation I have described may be applicable. The proposals of Monro and Petit, to make new conduits, by carrying a thread, or making an incision, into the sac, have long since been forgotten. Such artificial passages close as soon as the seton or the bougie ceases to be inserted. It seems essential to the object of restoring the course of the tears, that the canaliculus should itself furnish the channel; and this can be accomplished only in those instances in which the point of obstruction is sufficiently far from the sac to allow of the canal being slit up in the interval, and through the conjunctiva. Two methods of operating offer themselves: the first, by cutting transversely across

the direction of the canal, close to the obstruction, on the side towards the sac, and then slitting up the canal on a probe introduced at the wound made; the second, supposing no orifice can be found after this transverse section, by opening the sac below the tendo oculi, and then slitting up the canal, near the obstruction, on a probe run into it from the sac. The orifice of the canaliculi within the sac is so large, that I have no doubt a skilful surgeon could readily do this, if he had previously taken pains to acquaint himself with the anatomy of the parts. I have found it easy in the dead subject, but have not yet had a case in which to test its feasibility in the living. Of course the canal in these cases must be slit up through the conjunctiva, near the caruncle, or the tears could not find their way into it.

In conclusion, I would observe that there are cases of epiphora depending on obstruction of the canaliculi close to the sac, in which this operation would be out of place. The sac itself is empty; a probe passes easily along the canal from the dilated punctum, and is arrested at the entrance to the sac. If forced against the obstruction, the outer wall of the sac, with the skin over it, is moved towards the nose, and the surgeon experiences an elastic resistance; whereas, if there is no such stoppage, and the probe enters the sac, it comes into contact with the inner or osseous wall, and the skin over it is not moved. As the distance between the punctum and the inner wall of the sac is just half an inch when the canal is stretched by drawing the lid outwards, a probe covered with gold for that length will prove a useful help for determining whether the probe has actually penetrated the sac. In these cases, it will be remarked that the punctum is wetted by the tears; and it seems to me that that not uncommon dilatation of the orifice and of the canal, usually attributed to paralysis or relaxation, is, in fact, the consequence of the stricture—the tears constantly filling those parts on their way to the sac, but being unable to pass onwards.

DONATIONS

TO THE

ROYAL MEDICAL AND CHIRURGICAL SOCIETY,

1850-51.

The Volumes marked thus * were presented by the Authors.

ACTON, WILLIAM.

*Prostitution, in Relation to Public Health. 8vo. London, 1851.

ASHBURNER, JOHN, M.D.

Abhandlung über luxationen und Fracturen, etc. Von Astley Cooper. 8vo. Weimar, 1823.

Physico-Physiological Researches on the Dynamics of Magnetism, Electricity, Heat, Light, Crystallisation, and Chemism, in their Relations to Vital Force. By Baron Charles von Reichenbach. With the addition of a Preface and Critical Notes, by John Ashburner, M.D. 8vo. London, 1851.

BARLOW, WILLIAM FREDERICK.

*Observations on the Muscular Contractions which occasionally happen after death from Cholera. 8vo. London, 1850. (Part II, 1849.)

*An Essay on the Relations of Volition to the Physiology and Pathology of the Spinal Cord. 8vo. London, 1848.

*Observations on the Condition of the Body after Death from Cholera. 8vo. London, 1850.

*An Essay on Volition as an Excitor and Modifier of the Respiratory Movements. 8vo. London, 1850.

*Case of Softening (Ramollissement of the Brain; with General Observations, &c. 8vo. London, 1851.

BIRD, GOLDING, M.D. F.R.S.

*Urinary Deposits, their Diagnosis, Pathology, and Therapeutical Indications. Third Edition. 8vo. London, 1851.

BIRKETT, JOHN.

*The Diseases of the Breast, and their Treatment. London, 1850.

BLACKMAN, GEORGE C., M.D.

*Reduction of Strangulated Hernia in Mass. 8vo. New York, (U. S.) 1851.

BOARD OF HEALTH (from the).

Report of the General Board of Health on the Epidemic Cholera of 1848-9. Three Parts. 8vo. London, 1850.

Report on the Present State of Certain Parts of the Metropolis, and on the Model Lodging Houses of London. By R. D. Grainger. 8vo. London, 1851.

BRODHURST, BERNARD EDWARD.

*Of the Crystalline Lens and Cataract. 8vo. London, 1850.

BUSHNAN, J. STEVENSON, M.D.

*The Moral and Sanitary Aspects of the New Central Cattle Market, as proposed by the Corporation of the City of London. With Plans. 8vo. London, 1851.

CHAMBERS, THOMAS KING, M.D.

*Corpulence; or Excess of Fat in the Human Body, &c. 8vo. London, 1850.

CLAY, CHARLES, M.D.

*Obstetric Record, &c. Two Vols. 8vo. Manchester, 1848-9. And One Number of the Encyclopædia Obstetrica, &c. 8vo. 1848.

*The Results of all the Operations for the Extirpation of Diseased Ovaria, by the large Incision, &c. 8vo. Manchester, 1848.

*Practical Observations on the Use of Inspissated Ox-Gall in the Treatment of various Diseases, &c. 8vo. London, 1846.

COLLEGE (from the).

Pharmacopœia Collegii Regalis Medicorum Londinensis. 8vo. Londini, 1851.

COMMITTEE OF MANAGEMENT (from the).

Supplement to the Catalogue of the Library of the Athenæum. 8vo. London, 1851.

COTTEREAU, M. E.

*Des Alterations de l'Urine et des Moyens Physiques et Chimiques Employés pour les Reconnaitre. 8vo. Paris, 1850.

COTTEREAU, E., ET CHEVALIER, A.

*Essais Historiques sur les Métaux que l'on rencontre quelquefois dans les corps Organisés. 8vo. Paris, 1849.

COUNCIL (from the).

List of the Fellows and Members of the Royal College of Surgeons of England. 8vo. 1850.

Descriptive Catalogue of the Pathological Specimens contained in the Museum of the Royal College of Surgeons of England. Three Vols. 4to. London, 1848-9.

COUNCIL OF EDUCATION (from the).

General Report on Public Instruction, in the lower Provinces of the Bengal Presidency. Two Vols. 8vo. Calcutta, 1850-51.

Annual Report of the Medical College of Bengal. (Session 1850-51.) 8vo. Calcutta, 1851.

CRISP, EDWARDS, M.D.

London Medical Examiner, Monthly Review, and Statistical Journal of Practical Medicine. Edited by Edwards Crisp, M.D. Vol. I for 1850. 8vo. London, 1851.

*A Lecture on the Advantages of the Study of Natural History. 8vo. London, 1851.

CURLING, THOMAS BLIZARD, F.R.S.

*Observations on the Diseases of the Rectum. 8vo. London, 1851.

DAVIES, HENRY, M.D.

Elementi di Ostetrica, &c. Del Giovanni Bigeschi. 8vo. Firenze, 1819.

DUNN, ROBERT.

*A Case of Hemiplegia, with Cerebral Softening, and in which loss of Speech was a prominent symptom. 8vo. London, 1850.

ELLIS, GEORGE VINER.

*Demonstrations of Anatomy; being a Guide to the Knowledge of the Human Body by Dissection. Second Edition. 8vo. London, 1849.

ERICHSEN, JOHN.

*On the Study of Surgery. An Address Introductory to the course of Surgery, delivered at University College, London, at the opening of Session 1850-51. 8vo. London, 1850.

FORBES, JOHN, M.D. F.R.S.

*Of Happiness in its Relations to Work and Knowledge. An Introductory Lecture delivered before the Members of Chichester Literary Society and Mechanics' Institute, October 25th, 1850. 12mo. London, 1850.

GERGENS, FRANCIS, M.D.

*Wiesbaden; its Hot Springs, their Efficacy and Application. Translated from the German. 8vo. Wiesbaden, 1851.

GIRALDES, J. A. C. C.

*Thèse sur la question suivante, des Luxations de la Machoire. 4to. Paris, 1844.

GIRALDES, M.

Thèse presentée au concours pour une Chaire de Clinique Chirurgicale vacante à la faculté de Médecine de Paris. 4to. Paris, 1851.

GROVE, JOHN.

*Epidemics Examined and Explained; or, Living Germs by Analogy (?) to be a Source of Disease. 8vo. London, 1851.

HALL, MARSHALL, M.D. F.R.S.

*Synopsis of the Diastaltic Nervous System. 4to. London, 1850.

*On the Threatenings of Apoplexy and Paralysis, &c. 8vo. London, 1851.

HALLEY, ALEXANDER, M.D.

Della Elmintiasi nelle sue relazioni colla oculistica osservazioni del. Cav. R. C. Salvatore Alessi. 8vo. Roma, 1850.

HARVEY, WILLIAM.

*On Excision of the Enlarged Tonsil and its consequences in case of Deafness; with Remarks on Diseases of the Throat. 8vo. London, 1850.

HAYS, ISAAC, M.D.

Summary of the Transactions of the College of Physicians of Philadelphia, from August to October, 1850. 8vo. Philadelphia, 1850.

The Transactions of the American Medical Association. Vol. III. 8vo. Philadelphia, 1850.

The Twenty-Second Annual Report of the Inspectors of the Eastern State Penitentiary of Pennsylvania. 8vo. Philadelphia, 1851.

Report of the Pennsylvania Hospital for the Insane for the Year 1850. By Thomas S. Kirkbride, M.D. 8vo. Philadelphia, 1851.

HIGGINBOTTOM, JOHN.

Additional Observations on the Nitrate of Silver, with full Directions for its Use as a Therapeutic Agent. 8vo. London, 1850.

JOHNSON, HENRY CHARLES.

*Introductory Remarks on the Opening of the Session 1850-51, at the School of St. George's Hospital. 8vo. London, 1850.

JONES, HENRY BENCE, M.D. F.R.S.

*On Animal Chemistry in its Application to Stomach and Renal Diseases. 8vo. London, 1850.

*Contributions to the Chemistry of the Urine. (In Two Parts.) 4to. London, 1850.

*Second Appendix to a Paper on the Variations of the Acidity of the Urine in the State of Health. 4to. London, 1850.

LEE, HENRY.

*On the Origin of Inflammation of the Veins; and on the Causes, Consequences, and Treatment of Purulent Deposits. 8vo. London, 1850.

LEE, ROBERT, M.D. F.R.S.

*Memoirs on the Ganglia and Nerves of the Uterus. 4to. London, 1849.

*Memoir on the Ganglia and Nerves of the Heart. 4to. London, 1851.

LEROY-D'ETIOLLES.

*Thèse pour le Doctorat en Médecine, presentée et soutenue le 5 Août, 1850. 8vo. Paris, 1850.

LEVER, JOHN C. W., M.D.

*An Address delivered before the Members of the Hunterian Society of London, on February 19th, 1851. 8vo. London, 1851.

MACDOUGALL, HENRY JOHN.

On the Causes, Symptoms, and Treatment of Spermatorrhœa. By M. Lallemand. Second Edition. 8vo. London, 1851.

MACKENZIE, F. W., M.D.

Observations on Irritable Uterus; with Cases. 8vo. London, 1851.

MANTELL, GIDEON ALGERNON, F.R.S.

*Supplementary Observations on the Structure of the Belemnite and Belemnoteuthis. 4to. London, 1850.

On the Pelorosaurus; an Undescribed Gigantic Terrestrial Reptile, whose Remains are associated with those of the Iguanodon and other Saurians in the Strata of Tilgate Forest, in Sussex.

On a Dorsal Dermal Spine of the Hylæosaurus, recently discovered in the Strata of Tilgate Forest. 4to. London, 1850.

MOORE, GEORGE, M.D.

*Health, Disease, and Remedy, Familiarly and Practically considered in a few of their Relations to the Blood. 8vo. London, 1850.

ORMEROD, EDWARD LATHAM, M.D.

*On the Pathology and Treatment of Valvular Disease of the Heart and its Secondary Affections. 8vo. London, 1851.

PAGET, JAMES.

*Lectures on Inflammation. 8vo. London, 1850.

PEREIRA, JONATHAN, M.D. F.R.S.

*The Elements of Materia Medica and Therapeutics. Vol. II. Part I. Third Edition. 8vo. London, 1850.

QUAIN, RICHARD, M.D.

*On Fatty Diseases of the Heart. 8vo. London, 1850.

*Four Cases Illustrating the Injuries to which the Aortic Valves are liable during Muscular Efforts. 8vo. Edinburgh, 1846.

*Observations on Cerebral Apoplexy at Different Periods of Life. 8vo. London, 1849.

*The Stethometer; an Instrument for ascertaining the difference in the Mobility of opposite sides of the Chest, and thus facilitating Diagnosis. 8vo. London, 1850.

RIDGE, BENJAMIN, M.D.

*An Inquiry on the subject of Vaccination, addressed to the Royal Medical and Chirurgical Society. 8vo. London, 1851.

RIZZOLI (FRANCESCO) of Bologna.

1. Metodo per togliere la Claudicazione, etc. 4to. 1849.
2. Casi d'interruzione di continuita. 4to. 1849.
3. Ernia Inguinale congenita, etc. 4to. 1848.
4. De Nova Methodo Acupunctura, etc. 4to. 1847.
5. Caso di Parto prematuro Artificiale. 4to. 1847.
6. De Kelotomia in Cæci Intestini Hernia scrotali incarcerata. 4to. 1844.

1. Maniera di Enterorafia. 8vo. 1845.
2. Storia di un Gozzo Aneurismatico operato. 8vo. 1845.
3. Autoplastica del Collo. 8vo.

ROSSIGNOL, LE DOCTEUR.

*Recherches Anatomiques, Cliniques et Expérimentales sur la Nature et les Causes de l'Emphysême Pulmonaire (Asthme continu des Anciens). 8vo. Bruxelles, 1849.

SIEVEKING, EDWARD, M.D.

Guggenbühl, Sendschreiben an Lord Ashley ueber einige Punkte des öffentlichen Wohles. 4to. Basel, 1851.

SIMON, JOHN, F.R.S.

*General Pathology, as Conducive to the Establishment of Rational Principles for the Diagnosis and Treatment of Disease. 8vo. London, 1850.

*Report on the Sanitary Condition of the City of London, for the Year 1849-50. 8vo. London, 1850.

SNOW, JOHN, M.D.

*A Letter to the Right Hon. Lord Campbell on the Clause respecting Chloroform in the proposed Prevention of Offences Bill. 8vo. London, 1851.

SOCIÉTÉ DE CHIRURGIE DE PARIS.

Bulletin de la Société pendant 1848-50. Tome I. Paris, 1851; (and Tome II of the Mémoires de la Société de Chirurgie de Paris. 4to. Paris, 1851.

SUTHERLAND, ALEXANDER JOHN, M.D. F.R.S.

St. Luke's Hospital for Lunatics.—The Physician's Report for the Year 1850, with Statistical Tables for 1850 and the last Century. 8vo. London, 1851.

TILT, EDWARD JOHN, M.D.

*On the Preservation of the Health of Women at the Critical Periods of Life. 8vo. London, 1851.

Massé, sur l'appareil Galvano-Electrique portatif. 8vo. Paris, 1851.

TOYNBEE, JOSEPH, F.R.S.

*On the Structure of the Membrana Tympani in the Human Ear. 4to. London, 1851.

URE, ALEXANDER.

A Case of Carcinomatous Stricture of the Rectum, in which the descending Colon was opened in the Loin, by Alfred Jukes. With Plates. 4to. London, 1842.

WARD, NATHANIEL.

*An Introductory Address, delivered at the London Hospital Medical School, at the opening of the Session 1850-51. 8vo. London, 1850.

WARREN, JOHN C., M.D.

*Address before the American Medical Association, at the Anniversary Meeting in Cincinnati, May 8th, 1850. 8vo. Boston, U.S., 1850.

Report of a General Plan for the Promotion of Public and Personal Health, devised, prepared, and recommended by the Commissioners appointed under a Resolve of the Legislature of Massachusetts, relating to a Sanitary Survey of the State. (Presented April 25th.) 8vo. Boston, U.S., 1850.

WEBSTER, JOHN, M.D. F.R.S.

*Notes of a Recent Visit to several Provincial Asylums for the Insane in France. 8vo. London, 1850.

WEGG, WILLIAM, M.D.

*Observations relating to the Science and Art of Medicine. 8vo. London, 1851.

WEST, CHARLES, M.D.

*The Profession of Medicine; its Study and Practice, its Duties and Rewards. 8vo. London, 1850.

ZIEGLER, GEORGE J., M.D.

*An Inaugural Essay on Zoo-Adynamia, presented for the degree of Doctor of Medicine in the University of Pennsylvania. 8vo. Philadelphia, 1850.

INDEX.

PAGE

Amussat and Littre, relative merits of their operations in cases of obstruction of the colon 274

Aneurism, treated by compression 143

list of cases treated in Dublin by compression . . 148

statistics of cases treated by ligature 154

causes of failure in treatment of, by compression . 156

constitutional treatment in 158

Aneurismal dilatation of the posterior tibial vein, communicating with the popliteal artery 327

Aneurisms, dissection of a case of two popliteal, treated by compression 161

Atmospheric electricity, secondary physiological effects produced by 205

its effect in purifying the atmosphere . 217

Barker, T. Alfred, M.D., cases illustrating some difficulties in the diagnosis of pleuritic effusion 131

Barlow, William Frederick, on the relation of sleep to convulsive affections 167

Barnes, Robert, M.D., on fatty degeneration of the placenta . 183

Bellingham, O'Bryen, M.D., case of popliteal aneurism treated by compression, with remarks by 143

Bowman, William, on a new method of treatment applicable to certain cases of epiphora 337

Brain, disease in the, produced by affections of the ear . . 239

cases of, originating in affections of the tympanic cavity 254

inflammation of the, variations of the sulphates and phosphates in 277

Bronchial tubes, containing blood in case of removal of upper jaw - 47

PAGE

Cæsarean section, case of, by Dr. West 61
description of the operation . . . 66
rate of mortality after . . . 73
dimensions of pelvis in case of . . . ib.
sources of danger in . . . 74
frequency of hæmorrhage in . . . 75
use of chloroform in cases of . . 76
condition of wound in uterus after . . 79
causes of death in 147 fatal cases of . . 84
references to cases of 85
case of, by Dr. Oldham . . . 89
description of the operation in . . 92
Caruncle, use of 140
Cerebellum, disease in, originating in affections of the external meatus 259
Chloroform, on use of, in operations about the mouth . . 50
Letter from Dr. Snow on effects of, in a case of removal of tumour from upper jaw . . . 51
hæmorrhage perhaps increased by its use in Cæsarean section 76
in a case of delirium tremens . . . 296
Chorea, softening of spinal marrow in a boy affected with . . 37
association of, with rheumatism . . . 39
acute, variations of the sulphates and phosphates in . 277
Chylo-serous urine, experiments on 119
case of 127
Cock, Edward, a case of aneurismal dilatation of the posterior tibial vein communicating indirectly with the upper part of the popliteal artery, by 327
Colon, obstruction of the, relieved by operation in the groin . . 263
diagnosis of . . . 272
Compression, treatment of aneurism by 143
list of cases of aneurism treated in Dublin by . 148
causes of failure in treatment of aneurism by . . 156
dissection of two popliteal aneurisms treated by . 161
Convulsive affections, relations of sleep to . . . 167
Cyst, ovarian, dissection of 6
containing hydatids developed at the root of the neck . 315

Degeneration, fatty, of the placenta . . . 183
Delirium tremens, variations of the sulphates and phosphates in . 277
Diagnosis of morbid growths from the upper jaw . . 48
of pleuritic effusion, difficulties of . . . 131

PAGE
Dislocation of the femur, unusual form of 107
Distortion of the pelvis . . . . . ib.
Dixon, James, account of a case in which a large cyst containing hydatids was developed at the root of the neck, death ensuing from rupture of the left subclavian artery . 315
Dreaming, emotions of 169
Drummond, John, case of extensive necrosis of the bones of the cranium, and removal of large portions thereof . . 103
Duffin, E. W., successful case of ovariotomy 1
Dura mater, cases of disease of, from affections of the tympanic cavity 254

Ear, affections of the, which produce disease in the brain . . 239
external meatus of, anatomical observations on . . 240
disease of external meatus of, propagated to fossa cerebelli . 242
mastoid cells of, affections of the . . . 247
tympanic cavity of, affections of 249
labyrinth, affections of 251
table of disease of dura mater and brain originating in . . 254
Electricity, cause of sensations produced by . . . 206
atmospheric, secondary physiological effects produced by 205
its effect in purifying the atmosphere . 217.
used in practical surgery 221
Epiphora, new method of treatment of . . . 337

Fatty degeneration of the placenta 183
microscopical examination in . . 186
frequency of 192
management of 197
Femur, unusual form of dislocation of 109
Fistula in cheek, cured by heat of galvanic electricity . . 226
Fracture and distortion of the pelvis 107

Galvanism, experiments with heat produced by . . 225
section of soft parts effected by heat of . . . 229
mode of operating with 231
Granville, Dr., vascular tumour of uterus mistaken for ovarian tumour 12
Groin, operation performed at the, for the relief of obstructed colon 263

Hæmorrhage in Cæsarean section 75
Hassall, Dr., structure of placenta, normal, and in fatty degeneration, by 186
Heat of electricity, employment of, in practical surgery . . 221
Hernia, strangulated obturator, relieved by operation . . 233

PAGE

Hewett, Prescott, case illustrating difficulties of diagnosis of morbid growths from the upper jaw, with remarks, by 43
account of the dissection of a case in which two popliteal aneurisms had been treated by compression, by 161
Hydatid cyst developed at the root of the neck, with death from hæmorrhage 315

Jaw, upper, difficulties of diagnosis of morbid growths from . 43
effusion of blood into bronchial tubes in a case of removal of 47
use of chloroform in operations on . . 50
Johnson, Athol, cases of rupture of the liver or spleen, by . 53
Jones, H. Bence, M.D., on the variations of the sulphates and phosphates excreted in acute chorea, delirium tremens, and inflammation of the brain, by 277

Kidney, rupture of, with union 57
Kilian, Professor, his views on fatty degeneration of the placenta . 190

Labyrinth, affections of 251
Lacrymal canals, diagnosis of stricture of 347
Lange, Dr., account of state of uterus two years after Cæsarean section 81
Lateral sinus, disease in, originating in affections of the external meatus 259
Lee, Dr. Robert, dissection of an ovarian cyst by . . . 6
analysis of 108 cases of ovariotomy by . 10
Littre and Amussat, relative merits of their operations in cases of obstruction of the colon 274
Liver, cases of rupture of 53
union of rupture of 56
supposed rupture of, with recovery . . . 57
union of wounds of 58
Lizars, Mr., ovariotomy performed by 12
Luke, James, a case of obstruction of the colon relieved by an operation performed at the groin 263
Lung, slough in, obscure symptoms in cases of . . 137–40

Macilwain, Mr., remark on diagnosis in internal injuries . . 52
Marshall, John, on the employment of the heat of electricity in practical surgery 221
Mastoid cells, affections of the 247
Mayer, Joseph, experiments on chylous or chylo-serous urine . 119

PAGE
Meatus, external, of ear, anatomical observations on . . 240
disease of, propagated to fossa of cerebellum . 240
Meibomian glands, use of 342
Miasmatic substances, origin of 212
influence of ozone in removing . . 214
Milk, human, effect of reagents upon 123
Moore, Charles Hewitt, case of fracture and dislocation of the pelvis, combined with an unusual form of dislocation of the femur 107
Morbid growths from the upper jaw, difficulties of diagnosis of . 43
Mortality, rate of, after Cæsarean section . . . 73

Nairne, Robert, M.D., case of softening of the spinal marrow . 37
Necrosis of the bones of the cranium . . . 103
Needle, grooved, insufficient in some cases to detect fluid . 133

Obré Henry, a case of strangulated obturator or thyroideal hernia relieved by operation 223
Obstruction of the colon relieved by operation performed at the groin 263
Obturator hernia relieved by operation . . . 233
Oldham, Henry, M.D., cases of Cæsarean section by . . 89
Ovarian cyst, dissection of an 6
identity of structure with ovarium . . . 9
vascular tumour of uterus mistaken for . . 12
Ovariotomy, successful case of 1
prevention of the return of the neck of cyst in . 4
analysis of 162 cases of, with postscript by Dr. R. Lee 10
first performed by Dr. Nathan Smith . . . ib.
Ozone, chemical characters of 208
effects of excess of, in atmosphere . . . 210
most abundant in winter, and at high levels . . 219
Ozonometer 211

Pearse, George, M.D., history of a patient affected with chylo-serous urine 127
Pelvis, dimensions of, in a case in which Cæsarean section had been performed 72
fracture and distortion of 107
dimensions of, in case of fracture with distortion . . 113
Phosphates, their variations in certain diseases . . 277
Placenta, normal structure of 186
fatty degeneration of 183
microscopical examination of . 186
frequency of . . . 192

PAGE

Pleurisy, absence of symptoms in case of 140
Pleuritic effusion, diagnosis of 131
Poland, Mr., Cæsarean section performed by 92
Polypus of the nose, unusual course of 49
Popliteal aneurism, treated by compression . . . 143
dissection of a case of, treated by compression . 161
artery, communicating indirectly with aneurismal dilatation of the posterior tibial vein 327
Pterygo-maxillary fossa, growths originating in . . 49
Puncta lacrymalia, displacement of, a cause of epiphora . . 337
causes of 338

Rupture of the liver or spleen, cases of 53
and kidney, united 56
supposed, with recovery . . . 57
or spleen, not necessarily fatal . . 58
Rupture of internal organs, treatment in cases of . . . 59

Schönbein, C. F., on some secondary physiological effects produced by atmospheric electricity 205
Secondary physiological effects produced by atmospheric electricity . ib.
Skey, Mr., Cæsarean section performed by 66
Sleep, relation of, to convulsive affections . . . 167
state of circulation and respiration in . . . ib.
increase of motor force and muscular irritability in . 168
withdrawal of volition in 172
reflex actions in 173
Smith, Dr. Nathan, ovariotomy first performed by . . 10
Snow, Dr., on the effect of chloroform in an operation on a morbid growth from upper jaw 51
Spinal marrow, case of softening of, in a boy affected with chorea . 37
convulsions in paralysed parts in softening of . 41
Spleen, case of rupture of 55
Subclavian artery, rupture of the, in a case of hydatid cyst developed at the root of the neck 315
Sulphates and phosphates, their variations in certain diseases . 277

Thunderstorms, how purifiers of the atmosphere . . 217
odour developed during, similar to that of ozone . 218
Thyroideal hernia relieved by operation 233
Tibial vein, posterior, aneurismal dilatation of . . . 327
Toynbee, Joseph, observations on the pathology of those affections of the ear which produce disease in the brain . . 239

PAGE

Tympanic cavity, anatomical observations on 249
affections of 249
table of cases of disease of the dura mater and brain originating in affections of . . 254

Uterus, vascular tumour of, mistaken for ovarian tumour . . 12
slow union of wounds of 80
examination of state of, two years after Cæsarean section . 81

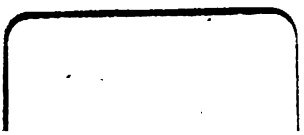
Vessels, congestion of, in chorea 40

West, Charles, M.D., account of a case in which Cæsarean section was performed 61

END OF VOL. XXXIV.

C. AND J. ADLARD, PRINTERS, BARTHOLOMEW CLOSE.

482-1



3 2044 103 088 720